CAUSING SPREAD OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE.

Biotechnology

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ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is the name of collection of lung disease including Chronic Bronchitis Emphysema and Chronic Obstructive Airways Disease people with COPD have difficulties breathing primarily due to the narrowing of airways this is called airflow obstruction COPD is one of the most common lung disease. The prevalence of Chronic Obstructive Pulmonary Disease (COPD), a lung disorder that is only partially treatable, has been linked to high rates of morbidity and mortality worldwide. Aims of this study to investigate the factor of causing spread of Chronic Obstructive Pulmonary Disease: **Method**: Present study was conducted at Department of Medicine and Thoracic Medicine and Hospital Darbhanga Bihar from October 2020 to March 2022. Total 60 cases both male and female whose age 30-80 years enrolled in this study. **Results**: Chronic Obstructive Pulmonary Diseases (COPD) has man preponderance as demonstrated through 31:19 ratio of Man with respect to Woman because of extraordinary occurrence of smoking of cigarette practices detected as fashionable case of males. Smoking of cigarette remained the main threat in case of COPD in our research work. Cough plus Cough along-with sputum remained the foremost medical indication perceived in our research work. Acting adjunct muscles of breathing through tightened lip inhalation was the chief medical symbol witnessed in our study. Spirometry is the compulsory examination to analyze also evaluates the rigorousness of COPD. Maximum quantity of cases had undecorated air route obstacle which was not changeable. Reduced movement of 'R' wave in chest leads, P Pulmonale, $QRS > +900$, R wave in V6 $<$ 5mm and R/S $<$ 1 in V5 V6 were the ECG variations detected in our experiment. The scientific frequency of Right heart failure (RHF) in chronic pulmonary obstructive disease (COPD) now our experiment was 5% whichever was established by Electrocardiography (ECHO). **Conclusion**: COPD (Chronic Obstructive Pulmonary Diseases) is a curable ailment for instance we know that cigarette smoking is the foremost threat for Chronic Obstructive Pulmonary Diseases (COPD).

KEYWORDS

COPD, Cigarette smoking, RHF, ECHO

INTRODUCTION:

Chronic Obstructive Pulmonary Disease (COPD) has been defined by the global initiative for chronic obstructive lung disease (GOLD) as a disease stage characterized by airflow limitation that is not fully reversible. There are two main forms of (COPD) chronic bronchitis involve a long term cough with mucus-i chronic bronchitis defined on the presence of chronic productive cough on most days for 3 months in eachof two consecutive year and (ii) Emphysema defined as permanent abnormal distention the air spaces distal to the terminal bronchitis by destruction of their wall without fibrosis.

Excluded from this defined is Bronchiole Asthma Chronic Bronchitis and Emphysema were frequently coexist since they share common ethological factor and offer many years Chronic Bronchitis get complicated by emphysema………..

GOLD estimates suggested that Chronic Obstructive Pulmonary Disease, six most common causes of death. Worldwide at present, will be the third most common cause of death worldwide by 2020.

In India Chronic Obstructive Pulmonary Disease is the second most common lung disorder after pulmonary tuberculosis.

These disease is frequently seen in middle aged Chronic Obstructive Pulmonary Disease affects male more frequently than females because of smoking.

It us equally prevalent in Ruler and Urban Area.

The globally Initiative for Chronic Obstructive Lung Disease (GOLD) recently revised its definition of Chronic Obstructive Pulmonary Disease, which now refers to it as "a common, preventable and treatable disease that is characterized by Persistent Respiratory Systems and Airflow Limitation that is due to airway and/or alveolar abnormalities that are usually caused by significant exposure to noxious particles or gases (Duncan *et al*., 2016)."

In high-income nations, smoking is considered the predominant risk factor for this exposure, whereas in low-income countries, occupational exposures and indoor cooking are significant risk factors. Corona virus disease 2019 (COVID-19) is an infectious disease which is major cause of death in 21 century. The clinical investigational response of COVID-19 is stringently diverse. Some patients are asymptomatic or mildly symptomatic; while others progress rapidly to Severe Pneumonia, Respiratory Failure, Multiple Organ Disease and even death. Persons with COPD found to have at higher risk of COVID-19 because of poor lung reserve and increased level of angiotensin-converting enzyme 2 (ACE-2) receptor in the small airways. According to European Union data, Chronic Obstructive Pulmonary Disease (COPD) is the third major prevalent cause of death (8%) and one of the major causes of morbidity and mortality globally (Reilly *et al*., 2017). It accounts for the highest portion of mortality for respiratory disorders (EU)

The combination of small airway illness, such as obstructive bronchiolitis, and parenchymal deterioration, or emphysema, which characterizes COPD, and the relative reasons of each condition varies
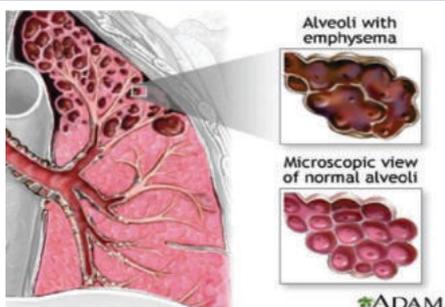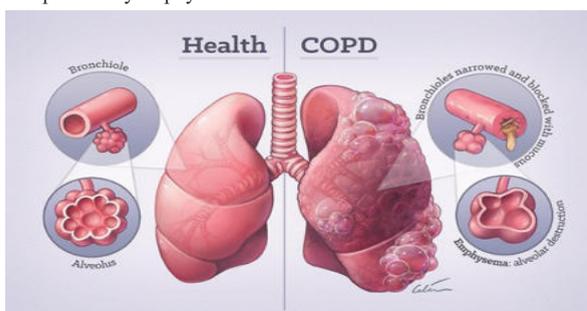
from individual to individual, is what leads to the chronic airflow limitation. Small airways become more narrowed and the lung parenchyma is destroyed as a result of chronic inflammation. Airflow restriction and mucociliary dysfunction, two symptoms of the disease that are characterized by the loss of tiny airways, may be a result.

Despite being the COPD risk factor that has received the most attention, smoking cigarettes, epidemiological research show that chronic diseases can also occur among who never smokes. Non smokers with chronic airway restrictions have milder illness, fewer symptoms, and a lower level of systemic inflammation than smokers with COPD (Viegi et al., 2007).

Non smokers with chronic air supply restriction showed lower level of developing cancer or cardiovascular comorbidities; nevertheless, they do have an elevated incidence of pneumonia and death from respiratory failure.

Chronic Bronchitis and Emphysema are the two primary elements of COPD (Nishimura et al., 2002). The former is indicated by a persistent or repeated rise in bronchial secretions that is adequate to induce expectoration. There are no other respiratory or cardiac explanations for the secretions, which are observable through most days for at least three months every year at least two consecutive years. Even in the utter lack of airflow constraint, hyper secretion can happen.

The latter is physically described as having an expansion of the air passages distal to the terminating bronchioles that is persistent and destructive without any apparent fibrosis.

Aim of the Study
- To investigate the age and sex distribution in COPD.
- To investigate clinical incidence of Heart in COPD
- To investigate various risk factors developed due to COPD
- To identify the clinical symptoms associated with spirometry deformity in COPD.

MATERIALS AND METHODS
From October 2021 to March 2022, this study was carried out at Department of Medicine and Thoracic Medicine, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar. Department of Medicine and Thoracic Medicine. Total 42 people make up the study's patient population.

Inclusion criteria
The cases in this study have the following characters:
- Cases involving people of both sexes between the ages of 30 and 80.
- These individuals have signs that point to persistent airway obstruction, such as coughing up sputum for more than two years straight, dyspnea, and with (or) without swelling of both legs.
- Cases in which a medical identification of COPD has been made.
- Each case underwent spirometry, with the presence of COPD indicated by post- bronchodilator spirometry findings of FEV1 < 80%, FEV1 / FVC < 0.7, Reversibility of obstruction < 15%.

Where, FEV1 = Forced Expiratory Volume in 1 sec. FVC = Forced Vital Capacity.

Exclusion criteria
Excluded from the study were those having a history of bronchial asthma, pulmonary tuberculosis, supportive lung illness, systemic hypertension, CAHD, primary pulmonary hypertension, valvular heart disease, and sleep apnoea syndrome.

Procedure
A proforma was created using the aforementioned inclusion and exclusion criteria to fulfill the study's objectives.

Geographic Distribution:
Patients came from Gaya districts' towns and rural areas. Each patient underwent the following procedures: a thorough medical history; a smoking history (Onset of smoking); a general examination; a respiratory system examination; a review of other systems; and a specific examination for signs of right heart failure such as elevated JVP, congestive hepatomegaly, and pedal edoema. Additionally, each patient underwent a conventional 12-lead electrocardiogram to check for changes in the ECG indicative of COPD and right heart failure.

Formulas were used to determine pack-years which are given below:-
No. of

$$\text{Pack Year} = \frac{\text{Cigarettes smoked / per day}}{20} \times \text{No. of years of smoking}$$

The patient was tested while relaxed in a chair with loose clothing. The patients were instructed to inhale deeply, then to lock their lips over the mouthpiece and blow as rapidly and violently as they could.

On a piece of recording paper, volume was measured along the vertical axis and time along the horizontal axis. The resultant curve is known as the forced vital capacity curve.

The volume of air that can be forced out (as quickly as feasible) following a maximal inhale is known as Forced Vital Capacity (FVC). It is measured in liters (Yuan et al., 2014).

Forced Expiratory Volume in one second (FEV1)
It is described as the amount of air exhaled in the first second following the commencement of the forced vital capacity's maximum expiratory effort. It is represented as a percentage of expected or in liters (Vestbo et al., 2011).

Forced expiratory volume in one second as a percentage of forced vital capacity $^{(FEV1 /FVC)}$
This phrase refers to the proportion of forced vital capacity that is expelled in the first second of a maximum expiratory effort. Patients were categorized based on their spirometry data using the COPD GOLD staging system (Vestbo et al., 2011). Clinical symptom severity and GOLD COPD stagnation were associated. Smoking pack years and COPD severity were compared.

Patients who displayed right heart failure clinically underwent echocardiography for confirmation. The modified Bernoulli's equation $(4v^2)$ was used in echocardiography to compute the trans tricuspid pressure gradient (TTPG) and the pulmonary artery pressure using the mean maximum TR velocity, which was recorded in millimeters per second.

RESULTS AND OBSERVATION
The results collected from this study were tabulated into different variants and incidence of each variant's percentage was calculated.

Table – 1

Age in Years	Male	Percentage	Female	Percentage	Total	Percentage
31-40	15	40.54%	5	21.74%	20	33.33%
41-50	3	8.11%	6	26.09%	9	15.00%
51-60	6	16.22%	7	30.43%	13	21.67%
61-70	9	24.32%	4	17.39%	13	21.67%
71-80	4	10.81%	1	4.35%	5	8.33%
Total	37	100	23	100	60	100

From the above table it is observed that the majority of cases among males were between 31 – 40 years of age constituting 40.54% and the minimum numbers of cases were in the age group of 41 – 50 constituting 8.11%.

Among females the majority of cases were in the age group of 51 – 60 years constituting 30.43%.

Both sexes put together the maximum cases were in the age group of 31 – 40 years constituting 33.33% of total cases and minimum cases were observed in the age group of 71 – 80 years which constituted 8.33% of total cases.

Distribution of gender:
Table – 2

GENDER	No. of cases	Percentage
Male	37	62%
Female	23	38%
Total	60	100%

From the above table, it is observed that the majority of the cases in this present study were belonging to male sex.

The male to female ratio was 31:19

Risk Factors
Table – 3

Risk factor	Male		%	Female	%	Total	Percentage
Smoking	Active	31	83.78%	5	21.74%	48	80.00%
	Passive			12*	52.17%		
Air pollution		8	21.62%	4	17.39%	12	20.00%
Chronic Respiratory Infection		15	40.54%	11	48%	26	43.33%
Allergy		5	13.51%	2	8.69%	7	11.67%

* Partners in case of feminine patients were hefty smokers i.e. greater than 20pack in a year of cigarette smoking).

We have distinguished from the data that foremost hazard cause for c o p d in case of male patient established 83.78% in man as well as 80.00% of entire cases.

Chronic respiratory infection that established48% off threat issue in case of ladies and 43.33% of entire cases.

Population due to air established 20.00% of danger element trailed by sensitivity reactions that established 11.67%.

Smoking Intensity
Table – 4

Pack year	No. of cases	Percentage
10 – 20	3	8%
20 – 30	27	75%
30 – 40	6	17%

As of the above mentioned table we have found that large number of cases had greater than 20 pack years of cigarette smoking which river established 92% of entire patients.

Entirely the cases in the aforesaid table were dynamic cigarette smokers involvingof equally men and women.

Disease Duration
Table – 5

Disease Duration	Females	Males	Total	Percentage
2 – 5 years	2	3	5	8.33
6 –10 years	4	6	10	16.67
11 – 15 years	9	11	20	33.33
16 – 20 years	5	13	18	30
> 20 years	3	4	7	11.67
Total	23	37	60	100%

As of the aforesaid table we have noted that number of patients had more than10 years period of illness.

Extreme figures of cases were perceived in the range from 11 to 15 years extent of ailment establishing 33.33% of patients.

Symptoms Distribution
Table-6

Symptoms	No of patients	Percentage
Cough	60	100%
Cough with expectoration of sputum	50	83.33%
Wheeze	41	68.33%
Breathlessness	49	81.67%
Swelling both legs	3	5.00%

As of the aforementioned table we have noticed that totally the patients in our search work head symptom of cough. Cough was the most important indication established 10% in our research work.

Cough along with sputum was existent in 83.33% of cases.Breathing difficulty established 81.6 7% of cases.Wheeze established 68.33% of cases.

Inflammation in both legs mutually was detected in 5% of cases.

Allocation Of Clinical Signs

Table – 7

Clinical signs	No. of patients	Male	Female	Percentage
Cyanosis	3	2	1	5.00%
Polycythemia	5	4	1	8.33%
Accessory musclesworking	28	21	7	47%
Pedal edema	3	2	1	5.00%
Raised JVP	6	4	2	10.00%
Congestive Hepatomegaly	7	5	2	11.67%

As of the aforementioned table we have found that active adjunct muscles of breathing were the foremost medical indication witnessed in 47% of the cases.

In our present research work polycythemia was detected in 8.33% of patients.

Pedal edema, raised JVP and congestive hepatomegaly were perceived in 5%, 10%, and 11.67% of cases, correspondingly.

Allocation Of Ecg Changes In Different Stages Of Copd
Table – 8

Stage of COPD (GOLD criteria)	ECG changes					
	Poor 'R' Wave progression in V1 – V6	'P' Pulmonale	QRS > + 900 in frontal plane	R/S <1 in V5 V6	V6 <5 mm	Total
Stage I	1	-	-	-	-	1
Stage II	5	-	-	-	-	5
Stage III	8	-	-	-	-	8
Stage IV	10	6	6	4	4	30
Total	24	6	6	4	4	44

Data represent that l a r g e number of v a r i a t i o n s ECG was realized in Stage IV of COPD cases.

Change in ECG was detected only in one patient who was in Stage I of COPD.

Allocation Of Patients In Gold Staging Of Copd
Table – 9

GOLD stage of COPD	Severity	No. of cases			Percentage
		Male	Female	Total	
Stage I FEV1 80%	Mild	2	3	5	8.33%
Stage II Fev1 50% – 80%	Moderate	10	7	17	28%
Stage III FEV1 30% – 50%	Severe	20	10	30	50.00%
Stage IV FEV1 < 30%	Very evere	5	3	8	13%

As of the aforementioned table, mainstream of patients enable resource work were belongs to Gold stage III of COPD presenting severe air flow blockade (FEV1 30% - 50%).

13% of the infected people exhibited FEV1 < 30% very severe airflow blockade went to stage IV of COPD.

DISCUSSION
- In our current research work total 60 numbers of cases have been taken.

Age And Sex:
- In our study we have found the maximum number of case between the age group of 31-40 years. This happen together fit with the few study as follows
- In present research, the situation was distinguished the prevalence of Chronic Pulmonary Obstructive Disease was greater in case of male patients as compared to female patients and found the male to female fraction of 31:19.

In our current research it was found that cases belongs to male constituted62% of the overall cases.

This result as well matches with the subsequent readings,
1. The study performed by some researchers showed 80% of cases were belongs to male patients (Trivedi *et al*., 1992).
2. The study performed by other scientist showed 93% of cases were belongs to male patients (Migueres *et al*., 1990).

Spirometry:
In our findings it was found that maximum numbers of infected population belongs to GOLD Stage III of COPD whichever established 50.0% of the diseasedpopulation.

Some scientists have performed the study and presented that mainstream of
infected people were in Stage 3 (British Thoracic Society Scheme for Chronic pulmonary obstructive disease) established between the range of 57 to 58% of diseased population (Higham *et al*., 2001).

In 1966, some researchers performed the study and found 76% of the infected population has its place to medium to critical phases of Chronic obstructive pulmonary disease (Renzetti *et al*., 1966).

CONCLUSION
* COPD (Chronic Obstructive Pulmonary Diseases) is a curable ailment for instance we know that cigarette smoking is the foremost threat for Chronic Obstructive Pulmonary Diseases (COPD).
* The Spirometry is obligatory to detect plus evaluate the rigorousness of Chronic Obstructive Pulmonary Diseases FEV1 was the single main vital consideration in spirometry to make a diagnosis of Chronic Obstructive Pulmonary Diseases along with the less than 15% of reversibility of airflow impediment to drugs.
* Rigorousness of Chronic Obstructive Pulmonary Diseases (COPD) takes straight kin through frequency of Electrocardiogram (ECG) variations in Chronic Obstructive Pulmonary Diseases (COPD).
* Medical symbols of right heart failure (RHF) in case of Chronic Obstructive Pulmonary Diseases (COPD) were actual while synchronizing the infected people for cor pulmonale.
* Right heart failure (RHF) signifies rigorousness as well as extent of Chronic Obstructive Pulmonary Diseases (COPD)

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