

Original Research Article

Role of X-ray in the Detection of Structural Changes Related to COPD in Smoker and Non-Smoker

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Abstract: Background: A entire of 10% of Chronic Obstructive pulmonary disease (COPD) are never Smokers because of occupational history positive like biogas and air pollution. And 90% of patients are Smokers. Smoking is main cause of COPD in worldwide. **Aim:** To determine the role of X-Rays in the Detection of Structural Changes Related to COPD in smokers and nonsmokers. **Material and Method:** This cross-sectional study was conceded out in Radiological department DHQ Medical institution Gujranwala. The duration of study was 4 months i.e. January 2022 to May 2022. Total no of patients was conduct in Radiology department with COPD are 100. Exclusion criteria included all patients who are not with COPD. **Results:** Total number of participants are 100 in out of which 10% are non-Smokers and 90% are Smokers. In which we evaluate the structural changes related to COPD. The Result shows hyper- inflated lungs (100%) occupy in smokers and never-smokers. And focal bullae are not occupying in smokers and never-smokers and Flattening of diaphragm are (8%) in non-smokers and (92%) in smokers Increase chest size in never-smokers are (1%) and in smokers are (99%) present. Tubular heart is (63%) in smokers and (37%) in non-smokers. **Conclusion:** In this prospective study 100 patients of COPD are involved of both genders. In which males are more common than females. The overall study rate of COPD in this study is 10/90 with higher occurrence in males in smokers.

Keywords: COPD, chest x ray, Emphysema, Chronic bronchitis, Smoking, Non-smoking.

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INTRODUCTION

COPD, or chronic obstructive pulmonary disease, is a group of diseases that origin airflow obstruction and inhale and exhale trouble. Emphysema and chronic bronchitis are symptoms (Singkam *et al.*, 2022). COPD is a term for chronic obstructive pulmonary disease. (COPD) is a worldwide wellbeing issue and a major source of decease (Comer *et al.*, 2013). COPD is a catch-all term that can refer to a variety of overlapping lung disorders (Bitar *et al.*, 2021). COPD is a diverse disease and can be arrange into dissimilar “phenotypes (Hussein *et al.*, 2020). The central airways, nonessential airways, lung parenchyma,

and lungs vasculature all visible systemic changes in COPD (Davidson & Bai, 2005). Airflow blockage is a symptom of chronic obstructive pulmonary disease (COPD), which involve chronic bronchitis and emphysema. Other symptoms include airway hyper sensitivity, persistence cough, sputum production, shortness of breath (SOB), wheezing, work out intolerance, and bad value of living (Organization, 2007). COPD is characterized by a mixture of parenchymal damage (emphysema) and minor airway illness (obstructive bronchiolitis), the relative presence of which differ from individual to individual. COPD high pretentious further than 300 million group in 2013, as maintain by to evaluate from the worldwide load of

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disorder work (Terzikhan *et al.*, 2016). Air pollution from vehicles, cotton mills, and industrial chemicals all contribute to Coimbatore's hyperactive airways. COPD, or chronic obstructive pulmonary disease, was the third highest cause of mortality in the combined States of appears in 2014. Developing countries are rapidly changing. Countries are experiencing an ever-increasing burden of non-communicable diseases (NCDs) as a result of socioeconomic development, industrialization, urbanization, shifting age structures, and changing lifestyles (Sureshkanna *et al.*). Chronic obstructive pulmonary disease (COPD) is a major source of disease and illness, as well as a major health issue (Ansari & Dixit, 2016). Tobacco cigarettes cause a lot of sickness and mortality all around the world (O'Farrell *et al.*, 2021). Smoke is a compound composition of substances that contains a large number of free radicals and oxidants (Tavilani *et al.*, 2012). COPD caused by smoking is linked to severe increasing and is linked to comorbidities including congestive heart failure disease and lung cancer (Truedsson *et al.*, 2016). Age and genetic predisposition are non-modifiable risk factors. Given the enormous prevalence and burden of COPD around the world, as well as the fact that there is presently no cure, prevention should be a top priority (Bondonno *et al.*, 2022). The majority of smokers in the United States claim they wish to quit, yet the majority are unable to do so due to nicotine addiction (Jacob III *et al.*, 2011). Although rising cigarette smoking among women in recent decades may account for some of the increase (Aryal *et al.*, 2013). The work of never smoker COPD cases will aid in the development of effective prevention strategies and the formulation of risk reduction strategies for better COPD care (Shah *et al.*, 2021). Two-dimensional (2D) digital chest radiography (CXR) is a low-dose imaging technology that can be used to visualize the changes in the lungs caused by COPD. X-rays are a simple, non-invasive imaging procedure that creates a one-parameter image of your heart, parenchyma, and diaphragm using electromagnetic waves. Whereas a chest x-ray unable to diagnose COPD, it can help in the primarily stages of the condition. Although it can aid in its support, an unusual chest x-ray is usually just detected whenever lung harm is severe. Chest x-ray may appear normal in the early stages. This isn't to say that there isn't any

damage. COPD may not be shown on a chest x-ray till it is critical. COPD patient could reveal distended lungs, irregular air pockets [bullae], or flattened diaphragm. A chest x-ray can additionally used to diagnose further disorder that is homogenous to COPD. X-rays of the chest could assist verify a finding of chronic bronchitis and to eliminate more parenchyma problems. which demonstrate lung overexpansion, tiny heart, increased intercostals volume, diaphragm depression, other conspicuous lung vasculature (Basharat *et al.*, 2021).

MATERIAL AND METHOD

This is cross sectional study design. This study will involve all patients referred to DHQ Gujranwala Radiology department and undergoing radiographic evaluation during the study period. The study duration will be 4 months from January 2022 to May 2022 in this study approximately 100 patients are included. A convenient sampling technique was used for the collection of data for the period of 4 months. Shimadzu X- Ray Machine was used with R-20J. In this technique patients will be on supine position, Chest X-Rays was performed under X –Rays machine in AP, PA, and lateral view to observe lung from apices to the base of lung.

RESULTS

Total number of participants is 100 in out of which 10% are non-Smokers and 90% are Smokers. In which we evaluate the structural changes related to COPD. All these were taken in order to check the lungs in DHQ Hospital Gujranwala from Radiology Department. ALL Data were collected and analyzed statistically with the help of SPSS 20. The Result for Structural changes by statically analysis that shows hyper- inflated lungs (100%) occupy in smokers and non-smokers. And focal bullae are not occupied in smokers and never-smokers. and Flattening of diaphragm are (8%) in never-smokers and (92%) in smokers Increase chest size in never-smokers are (1%) and in smokers are (99%) present. Tubular heart is (63%) in smokers and (37%) In non-smokers. All the given variables are explained in given below tables and graph.

Table 1

Smoking			Hyper inflated lungs	Focal bullae	Flattening of diaphragm	Increased chest size	Tubular heart
No	N	Valid	10	10	10	10	10
		Missing	0	0	0	0	0
Yes	N	Valid	90	90	90	90	90
		Missing	0	0	0	0	0

This table demonstrate that hyperinflated lungs 100% in both, focal bullae are not present in smoker and non-smoker, flatting of diaphragm 8% in non-

smoker and 92% in smoker, increased chest size 1% in non-smoker and 99% in smoker, tubular heart are 63% in smoker and 37% in non-smoker.

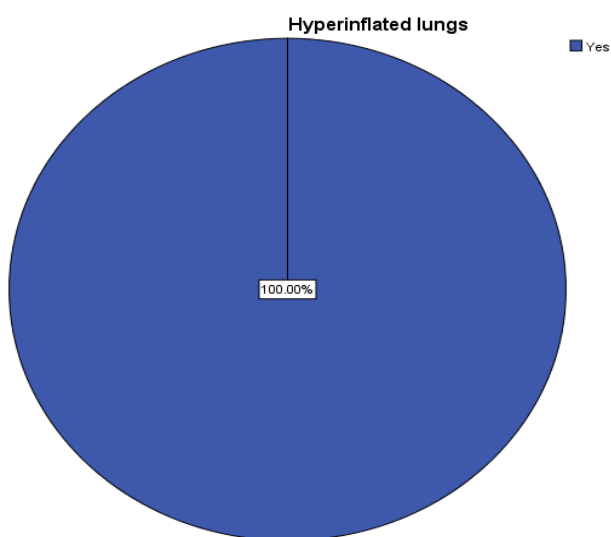
Number of Populations

Table 2: Shows that (90%) are smokers and (10%) are non smokers

		Frequency	Percent
Valid	No	10	10.0
	Yes	90	90.0
	Total	100	100.0

Table 3: Shows that hyper inflated lungs percentage in smoker and nonsmokers are (100%)

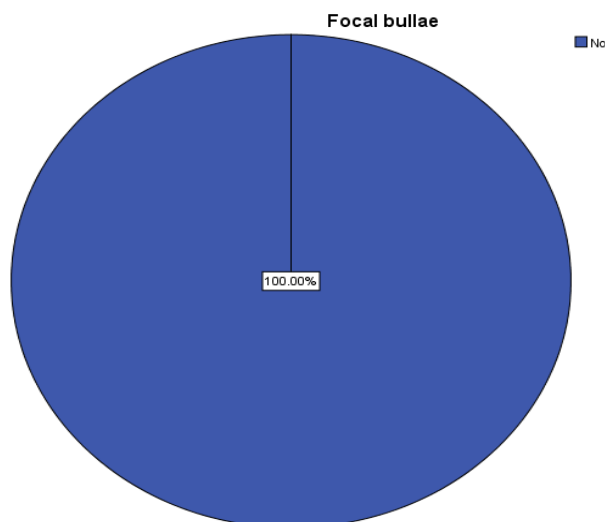
Hyperinflated lungs				
Smoking			Frequency	Percent
No	Valid	Yes	10	100.0
Yes	Valid	Yes	90	100.0



Graph 1: Shows that hyper inflated lungs percentage in smoker and nonsmokers are (100%)

Table 4: Shows that focal bullae are not present in smoker and non-smokers

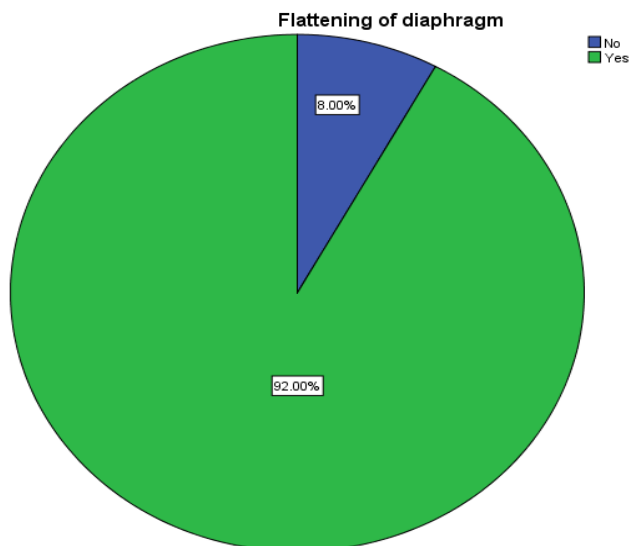
Focal bullae				
Smoking			Frequency	Percent
No	Valid	No	10	100.0
Yes	Valid	No	90	100.0



Graph 2: Shows that focal bullae are not present in smoker and non-smokers

Table 5: Shows that flattening of Diaphragm percentages are in smokers and nonsmokers is (92%) and (8%) Respectively

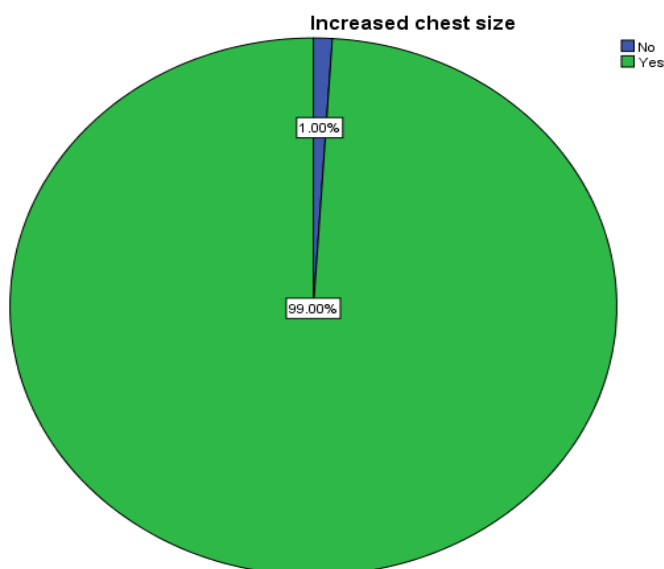
Flattening of diaphragm				
Smoking			Frequency	Percent
No	Valid	Yes	10	100.0
Yes	Valid	No	8	8.9
		Yes	82	91.1
		Total	90	100.0



Graph 3: Shows that flattening of Diaphragm percentages are in smokers and nonsmokers is (92%) and (8%) Respectively

Table 6: Shows that increase chest size percentage are present in smokers and non-smoker are (99%) and (1%) respectively

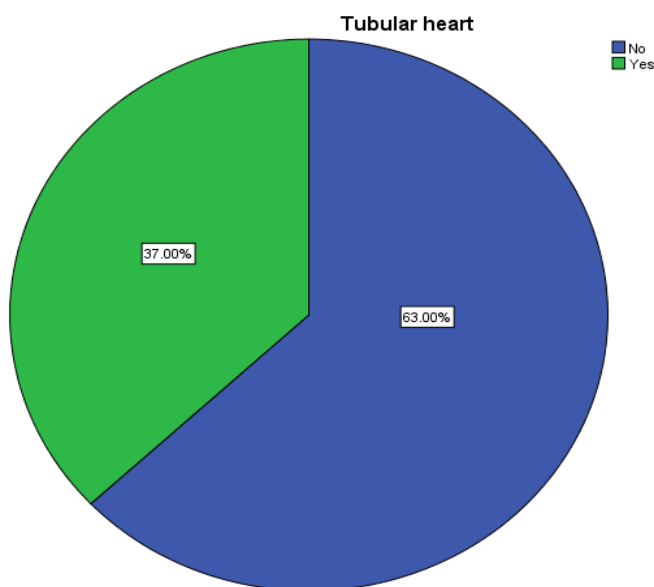
Increased chest size				
Smoking			Frequency	Percent
No	Valid	Yes	10	100.0
Yes	Valid	No	1	1.1
		Yes	89	98.9
		Total	90	100.0



Graph 4: Shows that increase chest size percentage are present in smokers and non-smoker are (99%) and (1%) respectively

Table 7: Showed that tubular heart percentage in smokers and non smokers is (63%) and (37%) respectively

Tubular heart				
Smoking			Frequency	Percent
No	Valid	No	7	70.0
		Yes	3	30.0
		Total	10	100.0
Yes	Valid	No	56	62.2
		Yes	34	37.8
		Total	90	100.0



Graph 5: Showed that tubular heart percentage in smokers and non-smokers is (63%) and (37%) respectively

DISCUSSION

COPD is a condition that affects everyone and has a high mortality rate. Various studies have been conducted to date in order to assess the prevalence in COPD. Tobacco is the almost prevalent source, but more element like air pollution along with heredity also have a role (Ansari & Dixit, 2016). Emphysema is the second phase, which is characterized by localized bullae on chest x-ray and a barrel chest (Hussein *et al.*, 2020). In difference to experience work that advise a direct association in the middle of in smoker patients time and COPD strictness, the direction for smoking was not obvious with time spent smoking. Cough, dyspnea, and varying degrees of sputum production are the most common symptoms. In our study, nearly similar numbers of smokers and non-smokers describe producing phlegm, confirming a familiar detail that smoking is the major source of glass cell hyperplasia and incidental phlegm hyper reactivity in the pathogenesis of COPD. This may describe the elevated phlegm producing described in our study among non-smokers with COPD, as biogas experience is prevalent in the common part of these cases (Shah *et al.*, 2021). In year 2022, a study was undertaken in the department of Radiology on 100 patients who were determined to have COPD. There are 90 males and 10 females in the group. The verification was done with the use of a pulmonary function test, which entails coughing and

spitting on most days of the week for three months of the annually, plus at the minimum two times annually after that (Rycroft *et al.*, 2012). Since the 1960s, efficacy of chest radiography in diagnosis for emphysema have been a source of disagreement. The degree of accord among chest radiograph interpretations and structural conclusion in radiological pathological link investigations varies from good to poor. As a result, the current work was approved in series toward evaluate chest radiography as a easy mode of determine or exclusive of emphysema. Radiographic standards that were validated against lung pathology were employed (Hussein *et al.*, 2020). Hyper-inflated lungs were shown to be present in both smokers and non-smokers inside this investigation. Both smokers and nonsmokers are devoid of focal bullae. Increased chest size is found in smokers (90%), but not in non-smokers (1 percent). Flattening of the diaphragm occurs in 8% of nonsmokers and 92% of smokers. Tubular heart disease affects 63% of smokers and 37% of non-smokers. The features of COPD in non-smokers and smokers have been compared and contrasted (Zhan, 2015).

CONCLUSION

In this prospective study 100 patients of COPD are involved of both genders. In which males are more common than females. The overall study rate of COPD in this study is 10/90 with higher occurrence in males in

smokers. Quantity in nonsmokers between COPD patients are considered higher in females than males. The air passage of epithelium from smoker and copd patients show memory of its domestic and above injuries by smoking, which is multi-layered and assist for years, therefore occupying in basal stem. All of Copd patient should be screened with chest x ray whenever required.

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