



EVALUATION OF CLINICAL PROFILES OF COPD AMONG SMOKERS AND AMONG PATIENTS WITH BIOMASS EXPOSURE

Pulmonary Medicine

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ABSTRACT

Background: COPD is the third leading cause of morbidity worldwide. Cigarette smoking is the most common risk factor for the development of COPD. However in nonsmokers biomass exposure is the most frequently reported risk factor. The aim of our study was to evaluate the clinical profile of COPD in smokers and patients with biomass exposure. **Methods:** One twenty seven consecutive cases, who were diagnosed as COPD from history, clinical features and spirometry were enrolled in the study. Patients were diagnosed as COPD based on Spirometry. Post bronchodilator Spirometry FEV1/FVC less than 0.70 was taken as diagnostic criteria. Chest x ray was done for all patients **Results:** Out of the 127 cases, 79 (62.2%) were smokers and 48 (37.7%) were nonsmokers, amongst which 30 (23.6%) had biomass exposure. Out of the smokers, 77(97.4%) were males and 2 (2.6%) were of age >45 years. Among the patients with biomass exposure, 23(76.6%) were females. Cough was the predominant symptom in 48(60.7%) of smokers with COPD and breathlessness was the predominant symptom in 19(63.3%) of patients exposed to biomass. Majority 45(56.9%) of smoker COPD patients had FEV1 in the range 30-50% whereas 16(53.3%) of biomass exposure COPD had FEV1 in the range 50-80%. Chest X ray showed Chronic bronchitis in 51(64.5%) smoker COPD patients and hyperinflation in 19(63.3%) of patients with biomass exposure. **Conclusion:** Most of the smoker COPD patients were elderly males, with cough as the predominant symptom, with severe airflow limitation and with CXR showing chronic bronchitis, whereas most of biomass exposure COPD patients were females, with dyspnea as predominant symptom, with moderate airflow obstruction and with CXR showing hyperinflation.

KEYWORDS

INTRODUCTION

COPD is the third leading cause of mortality worldwide, which is both substantial and increasing. COPD is characterized by an abnormal response of the lungs to toxic particles and gases, resulting in a progressive and not fully reversible airway obstruction, whose main pathologic hallmarks are bronchitis, bronchiolitis and lung parenchymal emphysematous destruction¹. Biomass smoke (BS) has also been proposed as one of the main risk factors for developing the disease, especially among non-smokers². In this respect, the existing evidence of clinical, functional, radiologic and histopathologic differences between TS and BS-exposed COPD patients has raised the hypothesis of two distinct phenotypes of COPD. Thus, in addition to the known gender difference on exposure chance, BS COPD patients exhibit a milder airflow obstruction –measured by FEV1 and FEV1/FVC– than TS COPD subjects, as well as a higher DLCO values. On the other hand, BS COPD patients show more anthracosis and pulmonary fibrosis than TS COPD patients³.

Given the toxicity of both kinds of smoke, a higher severity of pulmonary damage could be expected in double-exposed subjects. Following this line of thought, Dogan et al.⁴ compared lung histopathological alterations among rats exposed exclusively to TS, those exclusively exposed to BS and a group with combined exposure to TS and BS. They found an increased severity in perivascular inflammation, as well as higher parenchymal infiltration, number of alveolar macrophages and vascular wall thickness in lungs of rats exposed to both BS and TS than in those only exposed to BS alone. In turn, with data from the PREPOCOL study⁵, Torres-Duque et al.⁶ compared some demographical and functional parameters among 114 COPD patients exposed to wood smoke, 81 COPD patients exposed to TS and 264 COPD patients exposed to both types of smoke, reporting significant decreases in FEV1 and FEV1/FVC values in patients with a combined exposure.

The purpose of the present study is to elucidate whether there are differences in clinical and radiological profile among TS and BS COPD patients.

METHODOLOGY

Study Setting

Study was conducted in Department of Pulmonary Medicine, Gauhati Medical College, Guwahati from April 2022 to September 2022. It was an Hospital based observational study.

DIAGNOSIS OF COPD

We have evaluated 127 cases diagnosed as COPD attending the OPD and IPD of Department of Pulmonary Medicine. Clearance from ethics committee of GMCH was taken prior to the study and written informed consent was taken. Of this 18 were Non-smokers, without biomass exposure, and were excluded from the study. Rest 109 patients were included in the study. They were divided into Smoker COPD (TS COPD) and Biomass exposure COPD (BS COPD) groups. Patients were diagnosed as COPD based on Spirometry. Post bronchodilator Spirometry FEV1/FVC less than 0.70 was taken as diagnostic criteria. Chest x ray was done for all patients. Patients not giving consent were excluded from the study.

RESULTS

In this study out of 109 COPD patients 79(72.4%) were smoker and 30(27.5%) had exposure only biomass fuel. Analysing the age distribution, most of the smokers (40.5%) were seen in the age group of 61 to 70 years and most of the patients with biomass exposure (46.6%) belonged to age group of 51 to 60 years. Among smokers majority (97.50%) were males and among biomass exposure group majority (76.70%) were females.

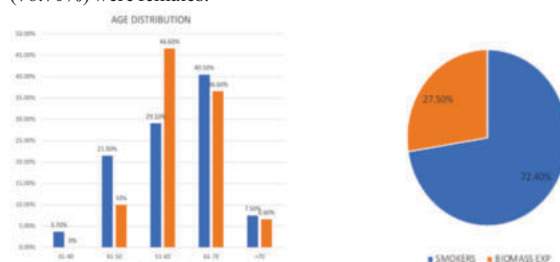
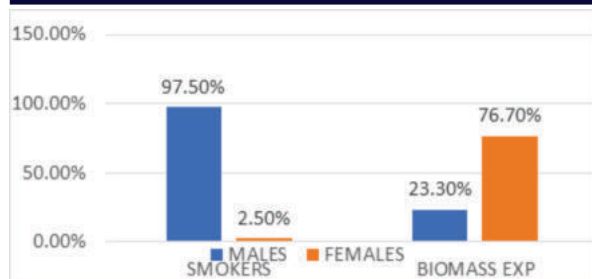


Fig: Age Distribution



On evaluating symptoms, among smoker group cough was the predominant symptom (60.7%) followed by dyspnea. On the otherhand among Biomass exposure group dyspnea (63.3%) was the most common symptom followed by cough.

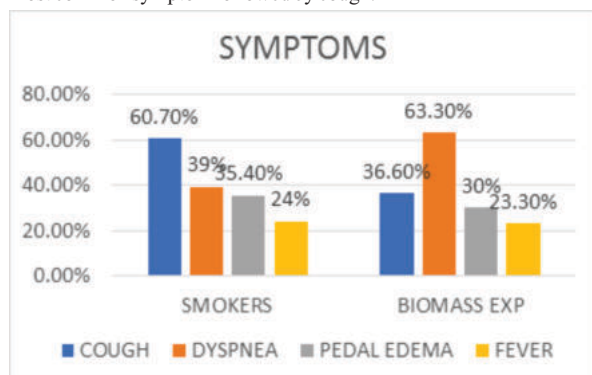


Fig: Symptoms Distribution Of Smoker And Biomass Exposure

On evaluating distribution of GOLD staging among the two groups, GOLD-III(56.9%) was most prevalent among smokers and GOLD-II (53.3%) was most common among biomass exposure group

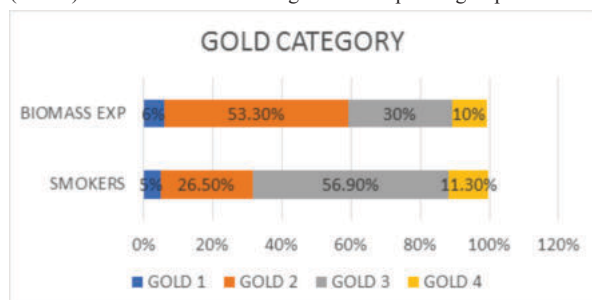


Fig: Gold Category Of Smoker And Biomass Exposure

Smokers mostly presented with features of chronic bronchitis (64.5%) in the Chest X ray and most of the patients in Biomass exposure group presented with hyperinflation (53.53%) in the chest radiography.

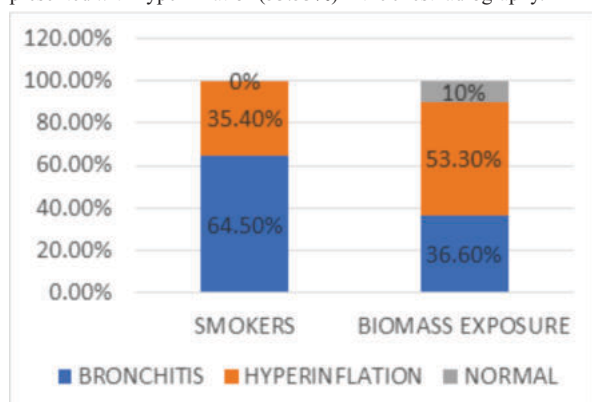


Fig: Chest X-ray Finding Of Smoker And Biomass Exposure

DISCUSSION

Smoking is a known cause of COPD, chronic bronchitis, and emphysema, and the risk increases with pack-years⁷. In this study the mean age of SM COPD group (63.8 ± 7.8) was higher than BM COPD

group (56.4 ± 9.5), similar to previous studies by Bajpai et al⁸ and Arbat et al¹³. In the SM COPD group, majority, (97.5%) cases were males and in BM COPD group, majority, (76.7%) cases were females. Study done by Bajpai et al⁸, majority of the patients were in the age group of 51-70 years. The mean age of smokers with COPD was significantly higher than nonsmokers with COPD (59.29 ± 10.28 years vs. 53.90 ± 8.77 years; $P = 0.0001$). Overall, males were predominant (57.2%) but there were higher number of female patients in nonsmoker group (25% vs. 70%; $P = 0.001$).

The major symptoms of COPD include cough, dyspnea, sputum production of varying severities⁹. In this study, most common symptom in the SM COPD group was Cough with sputum production, seen in 60.7% cases. Breathlessness and exercise intolerance are the most common symptoms in COPD and progress relentlessly as the disease advances¹⁰. While 39% of patients with smoker COPD presented with dyspnea, 63.3% non-smokers with COPD showed dyspnea. This is similar to the study by Bajpai et al⁸. In the SM COPD group, majority of the cases, (56.9%) belonged to Gold Severity grade-III, and in the BM COPD group, majority of the cases (53.3%) belonged to Gold Severity Grade-II. This is similar to studies by Bajpai et al⁸ where majority of nonsmoker with COPD were in GOLD severity grade II while in the smoking cohort majority were in GOLD severity Grade III.

Radiographically, emphysematous changes reflect the presence of lung destruction, over-inflation, and bulla formation which is a direct sign of emphysema. Focal areas of increased lucency due to the presence of lung destruction are difficult to identify, because of the limited contrast resolution of the chest radiograph. Some of the other signs of lung destruction include focal absence of pulmonary vessels and reduction in vessel caliber with tapering toward the lung periphery, which is highly suggestive of emphysema although it has low sensitivity. In the classic study by Thurlbeck and Simon¹¹, these findings had a sensitivity of only 40% in detecting emphysema.

CXR showed features of Chronic bronchitis, in most of the cases, (64.5%) in the SM COPD group, whereas in the BM COPD group most of the cases, (53.3%) had hyperinflation, in CXR and in 10 % cases CXR was normal. Study done by Shah et al.¹² shows that, the emphysematous changes in x-ray were present much more in the smoker group-21 (70%) as compared to the non-smoker group-11 (37%) ($P = 0.075$).

CONCLUSION

Most of the smoker COPD patients were elderly males, with cough as the predominant symptom, with severe airflow limitation, (FEV1 30-50%) and with CXR showing chronic bronchitis. Whereas most of biomass exposure COPD patients were females, with dyspnea as predominant symptom, with moderate airflow obstruction, (FEV1 50-80%) and with CXR showing hyperinflation.

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