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A CLINICAL STUDY OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN NON-SMOKERS

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ABSTRACT

Introduction: Chronic Obstructive Pulmonary Disease (COPD) is a major cause of chronic morbidity and mortality throughout the world. Many people suffer from this disease for years and die prematurely from it or its complications. COPD is the fourth leading cause of death in the world [1], and further increases in its prevalence and mortality can be predicted in the coming decades [2]. Tobacco smoking continues to be a major cause of COPD. However, tobacco smoking is not the only cause of COPD, and it may not even be the major cause in some parts of the world. This study is an attempt to study the clinical profile and the risk factors other than smoking in patients with COPD.

Materials and Methods:All patients who presented with history of cough, sputum, breathlessness or wheeze of more than 3 months duration to the medical outpatient department or admitted in medical wards of K.R.Hospital,Mysore were subjected to pre and post-bronchodilator pulmonary function testing. Those patients whose post bronchodilator FEV1/FVC was less than 0.7 and who satisfied inclusion and exclusion criteria were included in this study after informed consent.The sample size was 50 .

Results: Of 50 patients, 76% were females, 66% had <5 years duration of illness. Cough and expectoration was present in all,followed by breathlessness and wheeze. History of biomass fuel exposure was present in 84% and environmental tobacco smoke exposure was present in 100%. Occupational exposure was present in only 34% and air pollution exposure was present in 16%.**Conclusion**: Environmental tobacco smoke exposure and biomass fuel exposure were significant risk factors. According to this study, occupational exposure and air pollution were not significant risk factors.

Keywords: Non-smoker COPD ; Biomass fuel usage ; Environmental tobacco smoke.

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INTRODUCTION: Chronic Obstructive Pulmonary Disease (COPD) is a major cause of chronic morbidity and mortality throughout the world. Many people suffer from this disease for years and die prematurely from it or its complications. COPD is the fourth leading cause of death in the world [1], and further increases in its prevalence and mortality can be predicted in the coming decade [2] . American Thoracic Society defined COPD as "a disease state characterized by the presence of airflow obstruction due to chronic bronchitis or emphysema; the airflow obstruction is generally progressive, maybe accompanied by airway reactivity" [3]. Emphysema is defined as abnormal, permanent enlargement of the distal air spaces, distal to the terminal bronchioles, accompanied by destruction of their walls and without obvious fibrosis.Chronic bronchitis is defined as "the presence of a chronic productive cough on most days for three months ,in each of two consecutive years".

Tobacco smoking continues to be a major cause of COPD .However, tobacco smoking is not the only cause of COPD, and it may not even be the major cause in some parts of the world. As the awareness of ill effects of tobacco smoking has increased, prevalence of tobacco smoking is coming down. However, prevalence of COPD is increasing. This suggests that other risk factors of COPD are gaining more importance in etiology. Thus, investigations of COPD risk factors, ways to reduce exposure to these factors, and the molecular and cellular mechanisms involved in COPD pathogenesis continue to be important areas of research to develop more effective treatments that slow or halt the course of the disease [4].This study is an attempt to study the clinical profile and the risk factors other than smoking in patients with COPD.

AIM: To study the clinical profile of COPD in nonsmokers.

OBJECTIVES:

- To study the clinical profile of COPD in nonsmokers.
- To identify other risk factors (other than smoking) of COPD.

MATERIALS AND METHODS:

Study design:Hospital based Prospective Cross Sectional study.

Study setting: All patients who presented with history of cough, sputum, breathlessness or wheeze of more than 3 months duration to the medical outpatient department or admitted in medical wards of K.R.Hospital,Mysore.

Study subjects: All patients who presented with history of cough, sputum, breathlessness or wheeze of more than 3 months duration to the medical outpatient department or admitted in medical wards of K.R.Hospital, Mysore, and fulfilled the inclusion and exclusion criteria below and had given informed consent.

Sample size:50

Study period: November 1st 2008 to May 31st 2010.

Inclusion criteria:

1. Patients with post-bronchodilator FEV1/FVC<0.7 and non-smokers.

Exclusion criteria:

1. Smokers.
2. Bronchial asthma.
3. Pulmonary tuberculosis (present or past).
4. Interstitial lung disease.
5. Acute left ventricular failure and pulmonary edema.

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PROCEDURE:

Data was collected using a pretested proforma meeting the objectives of the study.Detailed history,physical examination and necessary investigations were undertaken.Pulmonary function testing was done using SpirobankII S/N V00056 spirometer. Three satisfactory efforts were recorded and best effort was considered.Bronchodilatation was done using 200 µg of inhaled salbutamol using a metered dose inhaler and test was repeated after 15 min.

Other investigations:

Complete Blood count with Differential count,ESR.

Blood urea,serum creatinine.

Absolute eosinophil count.

Spirometry(pre and postbronchodilator therapy)

Sputum for gram stain and Acid Fast Bacilli.

ChestX-ray PA view.

Urine:Albumin, Sugar,Microscopy

ECG in all leads.

Ethical clearance: Before collection of data, all subjects were briefed about the purpose of the study and written informed consent was obtained. All investigations were done free of cost and no financial burden imposed on the patient. Ethical clearance was obtained from the institutional ethics committee.

Statistical analysis: In this phase,collected data was entered into Microsoft Excel spreadsheet 365.Qualitative data was represented in the form of frequency and percentage.Qualitative data includes the gender of the patients, symptom profile, various exposure profiles.Association among qualitative variables was assessed by the ChiSquare test for all 2 X 2 tables and by the Fisher's Exact test for all 2 X 2 tables where the Chi-Square test was not valid due to small numbers. Quantitative data was represented using Mean ± SD and Median . Quantitative data includes the age of the patients,Pre and Post Branchodilator FEV1/FVC.Quantitative data was analysed using unpaired T test.Appropriate statistical software, MS Excel spreadsheet, SPSSv23 was used for statistical analysis. An alpha value or p-value of ≤ 0.05 was used as the cut-off for statistical significance. Results were graphically represented wherever deemed necessary using MS Excel package in Microsoft Office 365.

RESULTS:

Table 1: SEX DISTRIBUTION

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Gender	Number of Subjects
Female	38
Male	12
Total	50

Out of 50 cases , 76% were females and 24% were males with a p value of < 0.0001 , which was statistically significant.

Table 2: BIOMASS FUEL EXPOSURE

Biomass full exposure	Number of Subjects
Present	42
Absent	8

Out of 50 patients , 84% had exposure to biomass fuel and 16% had no exposure to biomass fuel.P value < 0.001 (statistically significant).

TABLE 3: ENVIRONMENTAL TOBACCO EXPOSURE.

Environmental Tobacco Exposure.	Number of Subjects
Present	50
Absent	0

History of exposure to environmental Tobacco smoke was present in all 50 patients (100%).It was statistically significant with a pvalue of < 0.0001.

TABLE 4 : OCCUPATIONAL EXPOSURE

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Occupational exposure	Number of patients	
No exposure	33	
Dust	10	
Husk	**3**	
Dust + husk	**1**	
Coal dust	**1**	
Textile mill	**2**	
Total	**50**	

Out of 50 patients, only 17 patients (34%) gave history of occupational exposure, 10 patients (20%) gave history of exposure to dust, 1 patient (2%) gave history of exposure to dust and husk, 3 patients (6%) gave history of exposure to husk, 1 patient (2%) gave history of exposure to coal dust and 2 patients (4%) gave history of exposure to textile mill dust. This was not statistically significant.

TABLE 5: EXPOSURE TO AIR POLLUTION

Pollution	Number of patients	Percentage
Absent	42	84
Present	8	16

History of exposure to air pollution was present in 8 patients (16%) which was statistically not significant .

DISCUSSION :

In the present study, 50 patients who had postbronchodilator FEV1/FVC <0.7 and who satisfied other inclusion and exclusion criteria were selected on the basis of simple random sampling method from the OPD and medical

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wards, K.R. Hospital, Mysore,..The clinical profile and risk factor profile in this current study is compared with other studies.

The mean age of present study population was found to be 43.9±12.8 years which is comparable to a study by Behrendt et al [5],where the mean age was 43.9±12.8 years.

In the present study, females account for 76%, with a male:female ratio of 1:3.16 .In the study conducted by Behrendt et al [5] similar pattern was seen with females accounting for 69.17% and a male:female ratio of 1:2.24.In another study by Mahesh et al [6] females were 88.46% with a male:female ratio of 1:7.66.

In the current Study , cough(100%) and expectoration (100%) were predominant symptoms, followed by breathlessness (62%) and wheeze (20%). In the study by Mahesh et al[6],similar pattern was seen with cough(100%) and expectoration (100%) being predominant symptoms, followed by breathlessness(90.9%) and wheeze(90.9%). Different pattern was seen in the study conducted by Behrendt et al [5] with breathlessness(26.24%) and wheeze(25.57%) being predominant symptoms followed by cough(11.55%) and expectoration (7.05%).

Environmental tobacco smoke exposure at home and/or at work was 100% in the present study. Similar results were seen in the study by Berglund et al[7] ,where, environmental tobacco smoke exposure at home and/or at work was seen in 62.58% of subjects and also in the study by Mahesh et al. [6] ,where it was seen in 60.86% of subjects. But Behrendt et al[5] , showed exposure only in 13.53% of subjects and Celli B et al[8] showed exposure in 29.07% of subjects . In the current study, environmental tobacco smoke exposure had statistically significant association as risk factor of COPD with a pvalue < 0.0001.

In the present Study, occupational exposure was seen in 34% of subjects which is comparable with Celli B et al [8] (33.84%) and Berglund et al [7] (20.4%).

In the current study, history of biomass fuel exposure was present in 84% of subjects .Similar results were seen in the study by Mahesh et al [6] , where biomass fuel exposure was present in 84.6% of subjects and also in Goel S et al. [9] ,where it was seen in 63.6% of subjects .These results are different from the study done by Celli B et al [8] , which showed exposure in only 7.21% patients. This difference might be due to sample size difference in the two studies with current study having a sample size of 50 and Celli B et al [8] having a sample size of 4544.In the current study, Bio mass fuel exposure had statistically significant association as risk factor of COPD with a pvalue < 0.001.

In the present study , 84% subjects were from rural background, which is comparable to Goel S et al. [9],where 72.73 % were from rural areas. In the study by Celli B et al [8] 46.20% were from rural areas.

In the present study, pre bronchodilator FEV1/FVC was 55.05±15.9 and post bronchodilator FEV1/FVC was 59.4±17.7.Similar results were seen in the study by Birring et al [10] ,where, pre bronchodilator FEV1/FVC was 55.±2 and post bronchodilator FEV1/FVC was 58±5.7.The percentage change in pre and post bronchodilator is 7.3% in the present study which is comparable to 5.1% in Birring et al. [10] study.

CONCLUSION :. This study of COPD in non -smokers is a cross sectional study with a sample size of 50 patients ,who came to the outpatient department or were admitted in medical wards of K.R. Hospital,Mysore from November 1st 2008 to May 31st 2010, with post bronchodilator FEV1/FVC <0.7. Mean age of population studied was 43.9±12.8 years. Male to female ratio was 1:3.16 with clear female preponderance .Cough and sputum production was the most common presenting complaint present in 100% of patients followed by breathlessness and wheezing. Biomass fuel usage (p value - <0.001) and environmental tobacco smoke exposure(p value - <0.0001) had significant statistical association as risk factors of COPD . Occupational exposure and air pollution were not associated with increased risk of COPD. Pulmonary function test showed no

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significant change in pre and post bronchodilator FEV1/FVC.

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