



A STUDY ON CLINICAL PROFILE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AMONG NON SMOKERS

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ABSTRACT

Background: The Global Burden of Disease Study projected that COPD, which ranked sixth as a cause of death in 1990, will become the third leading cause of death worldwide by 2020; a newer projection estimated COPD will be the fourth leading cause of death in 2030. 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. Epidemiological studies show that 5-12% of subjects with COPD are nonsmokers. Very little is known about the clinical, radiological and pathophysiological features of fixed airway obstruction in these subjects. Another reason to study COPD in non-smokers is that it might illustrate what other factors are important. This study is an attempt to study the clinical profile and the risk factors other than smoking in patients with COPD.

Material and methods: Patient who met the inclusion and exclusion criteria pulmonary function testing was done using hand held PC based spirometer, model: RMS- HELIOS 401. Considering acceptability and repeatability criteria three satisfactory efforts were recorded and best effort was considered. Bronchodilatation was done using 200 g of inhaled salbutamol using a metered dose inhaler and spacer and test was repeated after 15 min. Standard statistical method for data compilation and analysis, tables, charts, graphs and text. Software package like SPSS applied for statistical analysis.

Results: One hundred and two cases were studied. All patients were never smokers. Multiple environmentally hazardous parameters other than smoking were used as tool and analysed accordingly. Spirometry reading data were collected and analysed. Gold severity staging established.

Conclusion: In the study it was found that although occupational exposure and air pollution were not associated with increased risk of COPD, prevalence of COPD among non-smokers was more common in female population from the rural areas.

KEYWORDS :

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of chronic morbidity and mortality throughout the world. Chronic Obstructive Pulmonary Disease (COPD) is a major cause of health care burden worldwide and the only leading cause of death that is increasing in prevalence. The Global Burden of Disease Study projected that COPD, which ranked sixth as a cause of death in 1990, will become the third leading cause of death worldwide by 2020; a newer projection estimated COPD will be the fourth leading cause of death in 2030.¹

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.² Epidemiological studies show that 5-12% of subjects with COPD are nonsmokers. Very little is known about the clinical, radiological and pathophysiological features of fixed airway obstruction in these subjects. Another reason to study COPD in non-smokers is that it might illustrate what other factors are important.

This study is an attempt to study the clinical profile and the risk factors other than smoking in patients with COPD.

AIMS & OBJECTIVES

1. To study the clinical profile of COPD in non smoker.
2. To study the pattern of risk factors (other than smoking) of COPD.

STUDY AREA

Patient who are non smokers and fulfill the inclusion and exclusion criteria, attending out patient department or undergoing inpatient treatment at Burdwan Medical College Hospital, Burdwan.

STUDY POPULATION

Consecutive 102 non smoker COPD patient who met the following criteria

Inclusion Criteria:

Non smokers both male and female patient.
Patient with post bronchodilator FEV₁/FVC < 0.7.

Exclusion Criteria:

Smokers.
Bronchial asthma.
Pulmonary Tuberculosis (Present or past).
Interstitial lung disease.
Acute LVF and pulmonary oedema.

STUDY PERIOD

March 2013 to February 2014 (1 year)

SAMPLE SIZE

102 non smoker COPD patients.

STUDY DESIGN

Descriptive cross-sectional study.

PARAMETERS AND PROCEDURE

Patient who met the inclusion and exclusion criteria following investigations were done

1. HB%,TC,DC,ESR
2. Blood urea, serum creatinine
3. FBS/PPBS
4. Spirometry (pre and post bronchodilator therapy)
5. Sputum for AFB stain and gram stain
6. Chest X-Ray PA (postero-anterior) view and lateral view.
7. ECG

Pulmonary function testing was done using hand held PC based spirometer, model: RMS- HELIOS 401.To obtain an accurate recording the subjects were told to sit up upright, Get a good seal around the nose and mouthpiece of the spirometer, Rapidly inhale maximally, Without delay blow out as hard and as possible, Continue to exhale until the patient can blow no more. Expiration should be continued for at least 6 seconds (3 seconds in children under 10 years old) and upto 15 seconds if necessary. Considering acceptability and repeatability criteria three satisfactory efforts were recorded and best effort as considered. Bronchodilatation was done using 200 µg of inhaled salbutamol using a metered dose inhaler and spacer and test was repeated after 15 min.

METHODS OF DATA COLLECTION

Data was collected using a pretested proforma meeting the objectives of the study. Detailed history, physical examination and necessary investigations as described were undertaken.All the datas were put in the excel sheet of Microsoft windows for analysis.

PLAN FOR DATA ANALYSIS

Standard statistical method for data compilation and analysis,tables,charts,graphs and text. Software package like SPSS applied for statistical analysis.

RESULT ANALYSIS

One hundred and two cases were studied and following observation were made.

Table 1: Sex distribution

SEX	NUMBER OF PATIENT	PERCENTAGE
MALE	30	29.41
FEMALE	72	70.59
TOTAL	102	100

Out of the 102 cases studied, 72 patients were female and 30 patients were male.

Majority were females constituting 70.59% and males constituting 29.41%.

Table 2: Age distribution

Age group (years)	Number of patients	Percentage
21 – 30	4	3.92
31 – 40	26	25.49
41- 50	27	26.47
51 – 60	32	31.37
61 – 70	13	12.75
Total	102	100

Mean age of the studied patients was 47±11 years, minimum age being 22 years and maximum age being 70 years. Majority of the patients were in the age group of 51 to 60 years. Majority of patients, i.e. 62 patients (60.78%) gave duration of illness <5 years and 40 patients (39.22%) gave history of duration of illness of ≥ 5 years.

Table 3: Symptoms

Symptoms	Number of patients	Percentage
Cough	102	100

Sputum	102	100
Breathlessness	54	52.94
Wheezing	26	25.49
Chest pain	3	2.94
Fatigue	40	39.21
Weight loss	23	22.55
Fever	14	13.76
Swelling of lower limbs	22	21.57

Cough and sputum was present in all of the patients while breathlessness was present in 52.94%, weight loss in 22.55%, fatigue in 39.21%, wheezing in 25.49%, swelling of lower limbs in 21.57%, fever in 13.76% and chest pain in 2.94% of the patients.

All patients were never smokers.

Table 4: Biomass fuel exposure

Biomass full exposure	Number of patients	Percentage
No exposure	19	18.63
Exposure	83	81.37
Total	102	100

Table 5: Hours of exposure/day

Hours of exposure/day	Number of patients	Percentage
< 6 hours	30	29.41
> 6 hours	53	51.96
Total	83	81.37

Table 6: Years of exposure

Years of exposure	Number of patients	Percentage
< 10 years	17	16.67
> 10 years	66	64.70
Total	83	81.37

Table 7: Nature of fuel used

Fuel used	Number of patients	Percentage
No exposure	19	18.63
Firewood	58	56.86
Firewood + Cowdung	25	24.51
Total	102	100

Out of 102 patients, 83 patients (81.37%) gave history of biomass fuel usage and exposure. Of the 83 patients, 30 patients (29.41%) gave history of exposure <6 hours/day, 53 patients (51.96%) gave history of exposure >6 hours/day. Seventeen patients (16.67%) gave duration of exposure for biomass fuel <10 years whereas 66 patients (64.70%) gave history of duration of exposure for biomass fuel for >10 years. Increased duration of exposure to biomass fuel was associated with increased risk of COPD.

Fiftyeight patients (56.86%) gave history of firewood usage and 25 patients (24.51%) gave history of firewood and cow dung usage.

Table 8: Environmental tobacco smoke exposure

ETS exposure	Number of patients	Percentage
ETS exposure present	102	100
No exposure	0	0

Table 9: Hours of exposure /day

Hours of exposure	Number of patients	Percentage
< 3 hours	2	1.96
> 3 hours	100	98.04

Table 10: Duration of exposure in years

Years of exposure	Number of patients	Percentage
< 10 years	35	34.31
> 10 years	67	65.69
Total	102	100

History of exposure to environmental tobacco smoke was

present in all 102 patients (100%). Most of the patients, i.e. 100 patients (98.04%) gave history of environmental tobacco smoke exposure for >3 hours, only 2 patient (1.96%) gave history of exposure for <3 hours in a day. Thirtyfive patients (34.31%) patients gave environmental tobacco smoke exposure duration for <10 years and 67 patients (65.69%) gave duration for >10 years.

Table 11 : Occupational exposure

Occupational exposure	Number of patients	Percentage
No exposure	65	63.73
Dust	15	14.71
Husk	9	8.82
Dust + Husk	4	3.92
Coal dust	3	2.94
Textile mill	6	5.88
Total	102	100

Out of 102 patients, only 37 patients (36.27%) gave history of occupational exposure, 15 patients (14.71%) gave history of exposure to dust, 4 patient (3.92%) gave history of exposure to dust and husk, 9 patients (8.82%) gave history of exposure to husk, 3 patient (2.94%) gave history of exposure to coal dust and 6 patients (5.58%) gave history of exposure to textile mill dust.

Duration of exposure: Six patients (5.88%) gave history of exposure for <10 years and 31 patients (30.39%) gave history of duration of exposure for >10 years.

Eightytwo patients (80.39%) were living in rural area whereas 20 patients (19.61%) were living in urban area. History of exposure to air pollution was present in 20 patients (19.61%) which was statistically not significant.

Of the 102 patients studied, JVP was raised in 23 patients (22.55%) and pedal edema was present in 23 patients (22.55%). None of the patients had accessory muscles of respiration acting and cyanosis. Barrel shaped chest was present in 41 patients (40.20%), movements of chest was diminished in 56 patients (54.90%). Of the 102 patients studied, pulse rate was 88 ± 6 beats per min, bloodpressure systolic 136.93 ± 13.28 mmHg, diastolic 85.60 ± 10.85 mmHg, with respiratory rate 16 ± 2 per min.

On auscultation rhonchi was present in 60 patients (58.82%), crepitations was present in 83 patients (81.37%). Evidence of pulmonary hypertension on examination was present in 27 patients (26.47%).

Majority of patients (72.55%) had BMI within normal limits (18-24.9).

Chest X-ray showed chronic bronchitis in 29 patients (28.43%), chronic bronchitis and emphysema in 10 patients (9.80%), emphysema in 33 patients (32.35%) and was normal in 30 patients (29.42%).

On spirometry, pre-FVC (2.49 ± 1.15) and post-FVC (2.44 ± 0.89) change was not statistically significant.

Pre-FEV1 (1.39 ± 0.53) and post-FEV1 (1.46 ± 0.55) change was not statistically significant. Pre-FEV1/FVC (57.39 ± 7.75) and post-FEV1/FVC (60.1 ± 7.93) change was significant statistically.

Pre-PEFR (2.18 ± 1.42) and post-PEFR (2.21 ± 1.41) change was not significant statistically.

GOLD severity staging shows majority of patients 34 patients (33.33%) were in GOLD stage 2, 30 patients (29.41%) were in GOLD stage 3, 21 patients (20.59%) were in GOLD stage 1 and 17 patients (16.67%) were in GOLD stage 4.

DISCUSSION

Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity and mortality worldwide. Tobacco smoking is established as a major risk factor, but emerging evidence suggests that other risk factors are important, especially in developing countries. About 3 billion people, half the worldwide population, are exposed to smoke from biomass fuel compared with 1.01 billion people who smoke tobacco, which suggests that exposure to biomass smoke might be the biggest risk factor for COPD globally.

In the present study, 102 cases were selected on the basis of simple random sampling method from the OPD and medical wards, Burdwan Medical College & Hospital, Burdwan who had post bronchodilator FEV1/FVC <0.7, non smoker and met other inclusion and exclusion criteria of this study. Study period was March 2013 to February 2014 (1 year).

The mean age (in years) of present study population was 47 ± 11 years which was comparable to Behrendt et al. study¹⁰⁷ indicating mean age of study population of 42.2 ± 0.4 years.

In the present study, females account for 70.59% and male account for 29.41% with a male:female ratio of 1 : 2.4 which was comparable to other study groups like Behrendt et al¹⁰⁷ study indicating female 69.17% and male 30.83% , Celli B et al. study indicating female 67.89% and male 32.10% , Mahesh et al.²⁶ study indicating female 88.46% and male 11.54%.

In the present study, cough and expectoration were predominant symptoms, present in all patient followed by breathlessness, fatigue and wheeze present in 52.94% , 39.21% and 25.49% respectively. Symptom profile is comparable with Mahesh et al. study²⁶ showing cough and expectoration in all study population and breathlessness and wheeze was present in 90.9% of total study population. Symptomatic profile of Behrendt et al¹⁰⁷ study showing breathlessness, wheeze, cough and expectoration present respectively 26.24%, 25.57%, 11.55%, 7.05% of study population.

Environmental tobacco smoke exposure at home and/or at work was 100% in the present study. In Behrendt et al.¹⁰⁷ study environmental tobacco smoke exposure was present in 13.53% of total 495 study population, in Celli B et al.

Study environmental tobacco smoke exposure was present in 29.07% of total 4544 study population, in Berglund et al.¹⁰⁹

study environmental tobacco smoke exposure was present in 62.58% of total 147 study population and in Mahesh et al. study environmental tobacco smoke exposure was present in 60.86% of total 23 study population.

In the present study occupational exposure was present in 36.27% of total 102 study population. In other study like in Celli B et al.¹⁰⁸ study occupational exposure was present in 33.84% of total 4544 study population and in Berglund et al.¹⁰⁹ study occupational exposure was present in 20.4% of total 147 study population.

In the present study, history of biomass fuel exposure was present in 81.37% of total 102 study population. In other study like in Mahesh et al.²⁶ study biomass fuel exposure was present in 84.6% of total 26 study population and in Goel S et al.²⁵ study biomass fuel exposure was present in 63.6% of total 11 study population and in Celli B et al.¹⁰⁸ study biomass fuel exposure was present in 7.21% of total 4544 study population.

In the present study 80.39% subjects were from rural background. In other study like in Celli B et al.¹⁰⁸ study 46.20% and in Goel S et al.²⁵ study 72.73% were from rural

background. In the present study, pre and post bronchodilator FEV1/FVC was comparable to Birring et al. study.¹¹⁰ In Birring et al. study¹¹⁰ pre and post FEV1/FVC ratio was respectively 55 ± 2 and 58 ± 5 . In the present study pre and post FEV1/FVC ratio was respectively 57.39 ± 7.75 and 60.1 ± 7.93 .

SUMMARY & CONCLUSION

This study is a descriptive study with a sample size of 102 patients who came to the outpatient department or were admitted in medical wards of Burdwan Medical College and Hospital from March 2013 to February 2014 with post bronchodilator FEV1/FVC < 0.7 and non smoker. Mean age of population studied was 47 ± 11 years. Male to female ratio was 1:2.40 with clear female preponderance. Cough and sputum production was the most common presenting complaint present in 100% of patients followed by breathlessness and fatigue. Biomass fuel usage and environmental tobacco smoke exposure were the most common risk factors. Occupational exposure and air pollution were not associated with increased risk of COPD. Pulmonary function test showed no significant change in pre and postbronchodilator FEV1/FVC.

There are some limitation of this present study like sample size was small, i.e. only 102, It was a hospital based study and only symptomatic patients who presented to hospital were studied and exact quantification of biomass fuel exposure, environmental tobacco smoke exposure, occupational exposure and air pollution was not done. On the basis of the present study we can conclude that

- In this study of COPD in non-smokers, females were predominant.
- Environmental tobacco smoke exposure and biomass fuel usage were significant risk factors and more the duration of exposure more chance of developing COPD.
- Predominant symptom was cough and sputum production followed by shortness of breath.
- Most of the non smoker COPD were from rural population.

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