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Research Article

The raising epidemic of COPD in women

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) represents an important public health challenge that is both preventable and treatable. Although it is more frequently observed in males, the number of females with COPD is on the rise due to either active smoking or passive exposure and biomass fuel combustion.
Methods: It is a cross sectional study comprising forty female patients with signs and symptoms of COPD and graded according to Global association for obstructive lung diseases (GOLD) spirometry strategy. For all the enrolled patients, clinical history was taken and investigations like chest X-ray, Spirometry, Six minute walk distance test (6MWD) and BODE index was assessed.
Results: The majority of cases (72.5%) belong to fifth to sixth decade. Most of cases were from rural area. 85% of the COPD females were smokers. Among non smokers biomass fuel is major risk factor. COPD is common in patients with smoking history of more than 20 years. Duration of exposure to biomass fuel exceeded 45 years in the COPD subjects. The mean 6MWD was 311 meters suggesting low exercise capacity. Most of the patients with severe COPD have BODE score >7 with poor prognosis.
Conclusions: This study recognizes the prevalence of reverse chutta smoking among the COPD females and the risk of biomass exposure in the development of COPD in women, especially from rural areas. Identification and control of the risk factors are important steps in prevention and treatment of COPD.

Keywords: Chronic obstructive pulmonary disease (COPD), Six-minute walk distance test (6MWD), Biomass fuel, Spirometry, Chutta smoker

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is the fourth leading cause of death in the world, represents an important public health challenge.[1] Globally, the COPD burden is projected to increase in coming decades because of continued exposure to risk factors like tobacco smoking, outdoor occupational air pollution and indoor biomass fuel combustion.[2]

Biomass fuel usage is very common in rural India and reverse chutta smoking is rife in females living in certain coastal districts of Andhra Pradesh. Further, there is evidence that women are more susceptible to the effects of smoke than men are, due to various genetic, functional and environmental factors.[3]

This present study is conducted with an aim to study the effect of reverse chutta smoking and biomass fuel smoke in the development of COPD in female patients and analyze clinical profile in such patients.

METHODS

Forty female stable patients aged above 30 years with symptoms of chronic cough, mucoid/ mucopurulent expectoration, breathlessness, wheezing and spirometry showing forced expiratory volume in 1 second/ forced vital capacity (FEV1/FVC) <70%, with reversibility

<12% &<200ml absolute change in FEV_1 were enrolled in the study. Patients with active smoking and or exposure to biomass fuel / passive smoking were also included.

All male patients, patient with history of bronchial asthma, heart failure coronary artery disease, coexisting diseases like bronchiectasis, interstial lung disease, bronchogenic carcinoma, pleural diseases, sleep related breathing disorders and radiological abnormality other than COPD on chest X-ray were excluded from the study.

For all the forty selected patients, a detailed clinical history was taken and thorough examination done and investigations like chest X-ray, Spirometry, Six minute walk distance test (6MWD) and BODE index was assessed.

RESULTS

The mean age of the study population was 58 years with a range from 30 to 80 years. Most of the patients came from rural villages (n=26, 65%). In this study majority of patients (62.5%, n=25) have history of smoking and exposure to biomass fuel. Among smokers, 18 patients have history of reverse chutta smoking (72%). Six patients have history of exposure to only of biomass fuel (15%) (Figure 1).

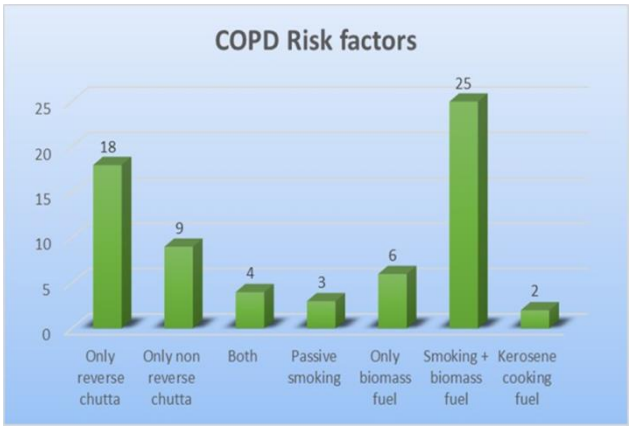

Figure 1: Risk factors for COPD in females.

In the study group maximum no. of patients (n=20, 50%) have stage III-severe air flow obstruction (35%≤FEV1<50%) at the time of presentation. Fourteen (35%) patients have stage IV-very severe COPD (FEV1 <35%) and six have stage II-moderate obstruction (50≤FEV1 <80%).

Among smokers, majority of cases (53%, 18/34) are in stage III disease with mean duration of smoking 27 years. 11 cases are in stage IV with a mean duration of 28 years and five cases in stage II. Among six cases of biomass fuel exposure, three were in stage III with mean duration of exposure 46 years and three were in stage IV disease with mean duration of exposure 50 years.

Six minute walk distance among the study group range from 290-486 meters with mean value of 311.1±83.04 with low range (295 mts) in stage IV and high range (480mts) in stage II group people.

BODE index score comprising Body mass index, Obstruction measured by spirometry FEV1 values, Dyspnoea grading and Exercise distance was calculated in all the patients. 13 (32.5%) patients have BODE score >7, 15 (37.5%) patients have score 5-6, 12 (30%) patients have score below 5 (Table 1).

Table 1: BODE prognostic score.

BODE score	No. Cases	Percentage	Stage	No. Patients
>7	13	32.5%	Stage-2	0
			Stage-3	3
			Stage-4	10
5-6	15	37.5%	Stage-2	0
			Stage-3	12
			Stage-4	3
<5	12	30%	Stage-2	5
			Stage-3	5
			Stage-4	2

DISCUSSION

Chronic Obstructive Pulmonary Disease (COPD), a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases.[4] Today in the developed countries nearly all cases of COPD are attributable to tobacco smoking. The Burden of Obstructive Lung Diseases program has documented more severe disease than previously found and a substantial prevalence (3-11%) of COPD among never-smokers.[5]

Although COPD is more frequently observed in males, the number of females with COPD is on the rise.[6,7] Smoking among women has been gradually increasing worldwide. In addition, smoke due to biomass fuel is being recognized as a potential risk factor in the development of COPD.[8]

In the coastal districts of North Andhra the tobacco product called “chutta” is smoked in a reverse fashion with the burning end kept inside the mouth, especially by females. This habit is highly prevalent in rural areas. The present study is conducted with an aim to study the clinical profile of female patients with stable COPD and to address the issue of reverse chutta smoking and biomass fuel exposure and their relationship with development of COPD.

The study group comprised of 40 female patients

diagnosed with stable COPD, diagnosis based on the GOLD strategy of a post bronchodilator FEV1/FVC <70% with BRT <12% and <200 ml FEV1.[9]

The mean age of study group was 58.37 years with majority belonging to 51-70 year range. 65% belonged to rural area and 35% belonged to urban area. The ratio is 1.8:1, which is lower than the rural urban ratio of 2.4:1 in the study by Jindal et al.[10]

85% of participants were smokers (n=34) and 15% were non smokers. In the present study, majority have a history of smoking as well as exposure to biomass (62.5%, n=25). Only six patients (15%) had exclusive exposure to biomass. Unprocessed wood was the most common cause and two cases were exposed to kerosene fuel smoke. In India, 70% of the homes use biomass fuel for cooking and heating purposes in poorly ventilated kitchens, and the amount of particulate matter pollution generated by the burning of biomass fuel is extremely high.[11] Ninety percent of rural households and 32% of urban households cook their meals on a biomass stove with only 25% of the cooking being done with cleaner gases.[12] Exposure to biomass smoke thus becomes a major risk factor for COPD in India. In the PLATINO study of Latin America 22% of COPD cases were exposed to mineral coal and 16% were exposed to wood smoke.[13]

Among the smokers, 18 were reverse chutta smokers, 9 were non reverse chutta smokers and 4 patients smoked both. Majority (71%) of them smoked for more than 20 years and three were passive smokers.

34 patients had severe and very severe COPD (stage III & IV). Two had cor pulmonale. Staging of smoker females ± biomass exposure showed that five of the stage II patients had a smoking duration of 26.6 years and 29 cases of stage III & IV had a smoking duration 24.2 years. Since the 29 cases included 22 cases of biomass exposure also, the combined effect may have resulted in early progression of COPD to advanced stages.

Six cases of COPD, who had biomass exposure alone belonged to stage III & IV with an average exposure duration of 46 to 50 years. In comparison, in a Turkey based case control study of 74 never smoked females with a history of biomass fuel exposure, the duration of exposure is around 30years.[14]

The mean BMI of the study group was 23.81, 22.84 and 16.81 in stage II, III and IV respectively, suggesting good association between BMI and Stage of COPD. The mean BMI (20.89 kg/m^2) is much less than the mean BMI of 23.9 kg/m^2 in a study of 30 female COPD patients by Nitton Macial et al study from Brazil suggesting lower nutritional status in Indian women.[15]

Six minute walk distance found to correlate well with the stage of COPD. The mean 6 MWD was 454.6, 308.6 and 265.5 meters in stage II, III and IV respectively. The mean 6 MWD was 311.1 meters; close to the mean 6MWD of 317.7 meters of the Brazil study.[15] Both groups had 6 MWD lower than the lowest predicted 6MWD indicating considerable physical limitation.

BODE index, a multidimensional 10-point scale in which higher scores indicate a higher risk of mortality was calculated for all the patients. 32.5% of the patients had a value of >7; 37.5% had 5-6 and 30% had <5 points. 10 out of 13 patients with a score of >7 belonged to stage IV, 12 out of 15 patients with score of 5-6 belonged to stage III, 10 out of 12 patients with a score of <5 belonged to stage II and III.

The present study identifies the strong association between reverse chutta smoking which is highly prevalent in north coastal Andhra region, and development of COPD. In addition, exposure to indoor air pollution from domestic combustion of solid fuel proves to be an important risk factor.

Although alpha -1 antitrypsin deficiency is an important risk factor for development of COPD, estimation of the enzyme levels could not be done in this study because of the expensive nature of the investigation. But none of the patients had a family history of COPD or associated cirrhosis.

COPD being a chronic, progressive disease poses a huge economic burden on the patient as well as the health-care systems.[16] At individual level, it frequently proves to be financially ruin-some for families with average income. On an average up to 15% of annual income is spent on smoking products and up to 30% on disease manage-ment.[17,18] Therefore it is necessary that measures such as mass education program to generate behavioral change in communities, awareness campaigns of tobacco cessation strategies, early diagnosis of disease, pharmaco-logical intervention and rehabilitation programs are adopted more seriously.

All efforts should be made to ameliorate indoor air pollution in village and urban slum houses of India. Active programs promoting improved biomass cook stoves, induction cookers with chimneys are to be taken up by governmental and non –governmental organizations. Education programs explaining the benefit of non-solid fuels like LPG, Electricity should be conducted.

CONCLUSION

This study recognizes the prevalence of reverse chutta smoking among the COPD females and the risk of biomass fuel exposure in the development of COPD in women, especially from rural areas. Since the prevalence and burden of COPD are projected to increase in the coming decades, identification and control of the risk factors are important steps in prevention and treatment of COPD. Tobacco control programs should be

implemented. With a combination of public policy and protective steps by the individual patient, risk exposure can be reduced.

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