Original Research Article

Impact of socio-economic status, rural background and gender on the prevalence of chronic obstructive pulmonary disease

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ABSTRACT

Background: *Prevalence of COPD and resistance towards drugs available for its treatment are increasing day by day.*

Objectives: *To assess the impact of socio-economic status, rural background and gender on the prevalence of Chronic Obstructive Pulmonary Disease.*

Methods: *This observational, prospective, open study was conducted in the Department of Chest & TB Rajindra Hospital, Patiala. A total of 250 patients were included in the study over a period of 1 year of mild to very severe stage of COPD according to GOLD guidelines for COPD 2011. Impact of rural background, household medium of cooking food, male: female ratio of disease occurrence, and patient's socio-economic status were evaluated using modified kuppuswami grading.*

Results: *In the rural population 100 patients out of 215 patients were males and 115 patients were females showing the rising trend of COPD in females of rural background and using biomass combustion and kerosene stove as the medium for cooking food, moreover most of the patients were living in the overcrowding. According to modified kuppuswami classification of socio-economic status, 170 patients were in the lower lower class, and 45 patients were in lower middle class socio-economic status in the rural background.*

Conclusion: *Highest prevalence of COPD was seen in 51-60 years age group and among the patients of rural background with 215 patients (86%) affected with COPD out of 250 patients. With modified kuppuswami grading of Socio-economic status (SES), we found out that maximum patients in the rural background were from lower lower class SES thus signifying that poor socio-economic status can be a link to COPD.*

Keywords: *COPD, gold, socio-economic status, prevalence, rural background*

Introduction

Chronic Obstructive pulmonary Disease is defined as a preventable and treatable disease state characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and is associated with an abnormal inflammatory response of the lungs to noxious particles or gases, primarily caused by cigarette smoking. Although COPD affects the lungs, it also produces significant systemic consequences. [1]

Chronic obstructive pulmonary disease (COPD) is responsible for early morbidity, high death rates and significant cost to health systems. The projection for 2020 indicates that COPD will be the third leading cause of death worldwide (from sixth in 1990) and fifth leading cause of years lost through early mortality or handicap (disability-adjusted life years) (12th in 1990). Active smoking remains the main risk factor, but other factors are becoming better known, such as occupational factors, infections and the role of air pollution. Prevalence of COPD varies according to country, age and sex. [2] There is some evidence that women may be more

susceptible to the harmful effects of tobacco smoke than men. [3] Occupational Dusts Inhalation of occupational dusts can cause COPD. The clinical importance of coal dust exposure has been studied in British miners.[4] Respiratory symptoms have been related to the use of several domestic cooking fuels, such as kerosene and other fuels in India. [5] Cigarette smoking is the major risk factor for COPD; passive smoking, indoor air pollution, occupational dust exposure and genetic factors are recognized as potential factors contributing to the development of COPD. [6]

Risk factors for COPD [7]

Known	Possible or Probable
Cigarette smoking Environmental or occupational dusts and gases	Air pollution Passive(involuntary) smoking Socioeconomic factors, Overcrowding

Many studies from developed countries suggested that socioeconomic status (SES), measured by income and educational level is associated with lung function and COPD in terms of exacerbation, prevalence and mortality. This association may be partly explained by the greater proportion of smokers among people in lower socioeconomic groups, but smoking may not explain all of the association. COPD is prevalent not only among smokers but also among never smokers. [8] The study was conducted to assess the impact of socio-economic status, rural background and gender on the incidence of Chronic Obstructive Pulmonary Disease.

Material and methods

The Prospective, observational, open label study was conducted from March 2014 to March 2015 after obtaining the approval from institutional ethics and research review board. A total of 250 patients of chronic obstructive pulmonary disease diagnosed by the Department of Chest and Tuberculosis, Government medical college, Patiala were enrolled. The patients fulfilling the inclusion criteria and having none of the exclusion criteria were enrolled in the study after obtaining written informed consent. Statistical analysis using (chi-square test) was done and p value was calculated. Data was also expressed in proportion and percentages.

Patient Inclusion Criteria

- A diagnosed case of COPD by Department of Chest and Tuberculosis, Government medical college & Hospital Patiala.
- Patient more than 40 years of age
- Exacerbations of COPD

Patient Exclusion Criteria

- Diabetic patients
- Suspected or confirmed tuberculosis patient
- Cardiac, gastrointestinal or hepatic insufficiency
- Asthmatic patient
- Age < 40 years
- Immunocompromised
- Pregnant and lactating females

Results

In present study Chronic Obstructive Pulmonary Disease was more prevalent in 51-60 years age group as 92 patients were in this age group (36.8%) followed by 61-70 years age group 70 patients (28%) were in this age group, followed by 41-50 years age group 66 patients (26.4%) were in this age group and 50 out of 66 patients (76%) in this group were females suggesting early onset of COPD in females, followed by 22
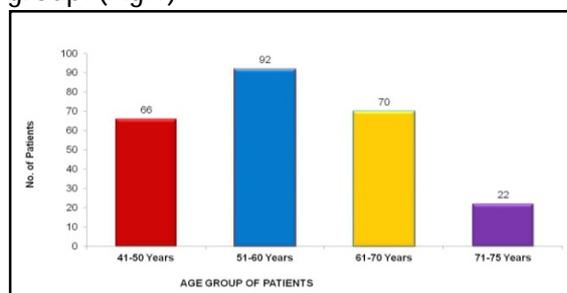
patients (8.8%) in the 71-75 years age group. (Fig.1)

Fig.1 Age group

In this study, amongst the urban population the disease was more prevalent among males as out of 35 patients in the urban area, 28 patients were males who were smokers and 07 patients were females who never smoked, while in the rural population 100 patients out of 215 patients were males having history of smoking and 115 patients were females having history of passive smoking, showing the rising trend of COPD in females of rural background. (Table 1)

Table 1: Distribution of patients according gender

Sr. No	Locality	Gender	Smoking Status	Total No. of Patients	Percentage	p-value
1	Urban	Males- 28 Females- 07	Smokers	35	14.0%	<0.001
			Never smoked			
2	Rural	Males - 100 Females- 115	Smokers	215	86.0%	<0.001
			Passive Smokers			
		Total		250	100%	

Table 2: Distribution of patients according to locality(Urban/Rural)

Sr. No	Locality	Cooking Medium	No. of Patients	Percentage
1	Urban area	LPG	35	14.0%
2	Rural area	Kerosene, biomass	215	86.0%
	Total		250	100%

Table: 3 Correlation of socioeconomic grading

Sr. No	Locality	No. Of patients	Lower lower	Lower middle	Middle middle	Upper lower	Upper middle	p-value
1	Urban	35	0	28	7	0	0	
2	Rural	215	170	45	0	0	0	<0.001

In the present study 215 patients out of 250 (86.0%) were of rural background and using Biomass combustion and kerosene stove as the medium for cooking food, moreover most of the patients were living in the overcrowding and 35 patients (14%) were residing in the urban area and were using LPG as the cooking medium for food. (Table 2) In the present study, with modified kuppuswami grading of socio-economic status, out of 35 patients (14%) living in urban setup 28 patients were belonging to the lower middle class and 7 patients were from the middle middle class socio-economic status and out of 215 patients out of 250(86%) living in the rural areas

adjoining Patiala district (where this study was conducted) 170 patients were in the lower lower class, and 45 patients were in the lower middle class socio-economic status. This signifies that COPD is occurring majority in people living in rural areas and that too belonging to the lower lower class socio-economic status according to modified kuppuswami grading of socio-economic status. (Table 3)

Discussion

Overall highest prevalence of COPD was seen in 51-60 years age group, the disease was also more prevalent in the patients of rural background with 215 patients (86%) affected with COPD out of 250 patients. Also among the rural background female patients were found to have a higher incidence of disease than male patients. Fuel from cooking food was also a cause of COPD as rural background patients were using kerosene stove etc as the medium of cooking food inside the house. Modified kuppuswami grading of socio-economic status was applied and we found out that maximum patients in the rural background were from lower lower class of socio-economic status thus signifying that poor socio-economic status can be a link to COPD. Statistical tests (chi-square test) was applied and the calculated p value comes out to be highly significant(p<0.001) for the association of smoking and the occurrence of COPD in female patients living in rural areas (53% rural vs 20% urban females). In a study conducted by Peng Yin, meih zhang in 2007 in china, the authors reported the prevalence among men was significantly higher than among women (3.4% vs. 2.4%, p < 0.001), rural area higher than urban area (3.1% vs. 2.5%, p < 0.001), and western areas (3.7%) higher than central (2.7%) and

eastern (2.2%) areas. The prevalence increased with age, from 0.8% in the youngest age group (15-29 years) to 7.5% in the eldest age group (60-69 years). Former smokers had a higher prevalence of COPD (9.0%) compared to current smokers (3.3%) and never smokers (2.3%). [9]

In another study conducted in china the results were similar where overall prevalence of COPD in the two areas (Liwang and Yunyan) was 9.4%. The prevalence of COPD in both the whole population and a subpopulation of non-smoking women in rural Yunyan was significantly higher than in urban Liwang (12.0% vs 7.4%, and 7.2% vs 2.5%, respectively). The use of biomass fuel was higher in rural Yunyan than in urban Liwang (88.1% vs 0.7%). Univariate analysis showed a significant association between COPD and exposure to biomass fuel for cooking. Pollutants measurements showed that concentrations of carbon monoxide, particulate matter with an aerodynamic diameter <or=10 microm, sulphur dioxide and nitrogen dioxide in the kitchen during biomass fuel combustion were significantly higher than those during LPG combustion. [10] Johnson P et al in 2011 also concluded that the overall prevalence of COPD in this study was found to be 2.44% (95% CI: 1.43-3.45). COPD prevalence was higher in biomass fuel users than the clean fuel users 2.5 vs. 2%, (OR: 1.24; 95% CI: 0.36-6.64) and it was two times higher (3%) in women who spend >2 hours/day in the kitchen involved in cooking. Use of solid fuel was associated with higher risk for COPD.[11]

From the present study we conclude that COPD although a smoker's disease is becoming common in women with passive smoking, and using kerosene stove and Biomass combustion as cooking medium in

home due to smoke inhalation in the rural areas, although the disease was also present in the patients living in urban areas but the cause in them was cigarette smoking. Also the onset of the disease start earlier in women as compared to men as in our study most females were of younger age group. COPD is also more prevalent among the patients have lower lower socio-economic status as found after the modified kuppuswami grading was applied. Future research will be needed to better understand the relationship in order to design appropriate interventions to reduce the burden of COPD. Furthermore, due to general lower health care infrastructure and lack of medical knowledge among people, COPD patients in rural areas had less frequent clinic visit compared to those in the urban areas.

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