

Chronic obstructive pulmonary disease and risk factors-with reference to gender, socioeconomic status and educational levels: A hospital based study

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Abstract

Introduction: COPD is projected to rank the third leading cause of deaths globally by 2030. Backwardness and poor socioeconomic status as well as educational status play a role in pathophysiology of COPD. Gender based differences occur due to interaction of sex-dependant genetic factors and also due to socio-cultural differences. Thus, present study was undertaken to study the role of socioeconomic status, gender and educational level in the subjects with COPD.

Materials and Method: The present study was cross sectional study. It included 150 COPD cases and 80 healthy non-smoker controls. Age, gender, education and socioeconomic status of subjects was enquired. Subjects were divided in various education and socioeconomic classes using modified Kuppaswamy scale. Data was analyzed using appropriate statistical tests.

Result: The mean age of the subjects in control group (n=80) was 38.36±13.24 years. Mean age of male COPD patients was 45.28±14.05 and that of female COPD patients was 41.12± 6.78 years. In controls, fifty six (70%) were males and twenty four (30%) were females. In COPD group (n=150), ninety eight were males (65.34%) and fifty two were females (34.66%). Overall, higher percentage (73.34%) of COPD cases belonged to middle, lower middle and lower class. Out of 150 COPD cases, 20(13.34%) and 19(12.66%) belonged to professional and graduate educational level. Thus, more number of COPD cases belonged to lower educational status. Amongst COPD cases the percentage of people residing in urban areas was found to be more i.e. 96(64%).

Conclusion: The present study identifies male gender, urban residence, low education and low socioeconomic status as risk factors in COPD.

Keywords: Demographic profile, Chronic Airway Disease, Social Class, Education, Residential Locality, Risk Factors in COPD

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Introduction

As per the WHO, Chronic Obstructive Pulmonary Disease (COPD) carries its own negatively high importance in matters of public health, needing our immediate attention. Verily, COPD is a life threatening disease, which causes obstruction in normal breathing initially. It is projected that globally by 2030 COPD would be the third leading cause of deaths.⁽¹⁾ Data reveal that the incidence of the disease has been ruling high over the urban as well as the rural males of the country during the years 2011 to 2016. The existing evidence is indicative of the fact that among other factors, poor socioeconomic status constitutes a risk factor, contributing to the development of COPD.⁽²⁾ Though, the role of this factor is not clearly specified, yet this pattern apparently reflects exposure to various causative factors including indoor air pollution, crowding, poor nutrition and/or other factors, related to a low socioeconomic status.^(3,4) Most probably, the socioeconomic risk factors are multi-factorial that may cover the entire range from intra-uterine exposure, to childhood infections and childhood environment, diet and to occupational factors.⁽⁵⁻¹¹⁾ Genetic predisposition and airway infections also contribute to accelerated lung function decline.⁽¹²⁻¹³⁾ Gender-based differences in Obstructive Airway Diseases occur due to the

interaction of sex-dependent genetic factors and also due to socio-cultural differences.⁽¹⁴⁻¹⁶⁾ The socioeconomic status also influence the outcomes in COPD, but there are studies which have proven otherwise.⁽¹⁷⁾ The disease is associated with poor prognosis in low and middle income population.⁽¹⁸⁾ Also, there are contrasting results as far as the role of gender and education is concerned. Studies have shown that the above two parameters influence the quality of life in COPD whereas others have found no association.⁽¹⁹⁾ Thus, present study was undertaken to study the role of socioeconomic status, gender and educational level in the subjects with COPD.

Materials and Method

The present study was cross sectional study. The patients diagnosed with COPD(n=150) were selected from TB and Chest Disease Out-Patients Department (OPD) of IIMS&R, Integral University, Lucknow, Uttar Pradesh. The period of study was from May 2016-April 2017. Healthy subjects, serving as controls (n=80) were selected from the Institution. The ethics clearance was obtained. Written and informed consent was obtained from all the subjects. Subjects who were willing to participate were included. Subjects suffering from any other chronic disease apart from COPD and pregnant

females were excluded from the study. The subjects were asked about smoking history, socio economic status, education and place of residence (rural and urban). Subjects were divided into various education and socio economic class on the basis of revised Kuppuswamy scale.⁽²⁰⁾

Statistical Analysis was done, using the statistical package for social science (SPSS 21.0) for Window's. Chi Square test was used for non-parametric data. Risk factors were taken as independent variables and COPD as dependent variable. Regression Analysis was done to find the role of gender, education and social class in COPD. Odds Ratio and Confidence Interval 95% were calculated. p value of less than 0.05 was taken as statistically significant.

Results

The mean age of the subjects in Control group was 38.36 ± 13.24 years. Mean age of male COPD patients was 45.28 ± 14.05 and that of female COPD patients was 41.12 ± 6.78 years. In controls, fifty six (70%) were males and twenty four (30%) were females. In COPD group, ninety eight were males (65.34%) and fifty two were females (34.66%). Overall, higher percentage (73.34%) of COPD cases belonged to middle, lower middle and lower Class Out of 150 COPD cases only 20(13.34%) and 19(12.66%) belonged to professional and graduate educational level. Thus, more number of COPD cases belonged to lower educational status. Amongst COPD cases the percentage of people residing in urban areas was found to be more i.e. 96(64%) [Table 1, 2, 3, 4 and 5].

Table 1: Age, gender and residential status of control (80) and COPD (150) cases (number and percent)

	COPD Cases				
	Control(80) n (%)	Mild(40) n (%)	Moderate(53) n (%)	Severe(30) n (%)	Very Severe(27) n (%)
Pack Years	-	12.59±2.96	22.34±5.48	27.89±6.58	30.28±7.54
Age(years)*					
20-30	23(28.75)	7(17.50)	11(20.75)	8(26.66)	3(11.11)
31-40	24(30)	19(47.5)	14(26.42)	5(16.67)	5(18.51)
41-50	21(26.25)	8(20)	8(15.09)	7(23.34)	4(14.82)
51-60	6(7.5)	6(15)	14(26.42)	8(26.66)	9(33.34)
61-70	4(5)	-	3(5.66)	2(6.67)	4(14.82)
>71	2(2.5)	-	3(5.66)	-	2(7.40)
Gender					
Male	56(70)	30(75)	31(58.49)	19(63.34)	18(66.67)
Female	24(30)	10(25)	22(41.51)	11(36.66)	9(33.33)
Residential Area					
Rural	48(60)	12(30)	19(35.85)	13(43.34)	10(37.03)
Urban	32(40)	28(70)	34(64.15)	17(56.66)	17(62.97)

Mean age of male COPD patients was 45.28 ± 14.05 and that of female COPD patients was 41.12 ± 6.78 years. Overall 96(64%) COPD patients belonged to urban areas. *Chi Square for age (years) was significant at $p=0.032$ (value 12.215, df 5)

Table 2: Gender wise distribution in controls and cases

	Gender	
	Males	Females
Control(n=80)	56(70%)	24(30%)
COPD Cases(n=150)	98(65.34%)	52(34.66%)

Chi Square shows $p=0.474$ (value 514, df 1)

Table 3: Socioeconomic status of control and COPD cases

Social Class	Control (n=80)	COPD Cases (n=150)
	n (%)	n (%)
Upper Class	14(17.50)	16(10.67)
Upper Middle	19(23.75)	24(16)
Middle	24(30)	50(33.33)
Lower Middle	12(15)	31(20.67)
Lower	11(13.75)	29(19.33)

Overall 110(73.34%) COPD patients belonged to middle, lower middle and lower class. Chi Square show $p=0.234$ (value 5.555, df 4).

Table 4: Educational status of control and COPD cases (number and %)

Education	Control (n=80)	COPD Cases (n=150)
	n (%)	n(%)
Professional	11(13.75)	20(13.34)
Graduate	16(20)	19(12.66)
Intermediate	14(17.5)	32(21.34)
High school	8(10)	30(20)
Middle school	7(8.75)	14(9.34)
Primary School	11(13.75)	16(10.66)
Illiterate	13(16.25)	19(12.66)

Chi Square shows $p=0.369$ (value 6.505, df 6)

Table 5: Level of significance of various risk factors in COPD (* $p<0.05$)

Factor	Odds Ratio (Confidence Interval 95%)	p value
Gender(male)*	1.325 (1.002-1.753)	0.037*
Residential Area (urban)*	0.375(0.215-0.655)	0.001*
Educational status		
Graduate/Postgraduate	1.244(0.449-3.447)	0.675
Intermediate/Post High School Diploma	0.813(0.308-2.142)	0.675
High School Certificate	1.564(0.608-4.022)	0.353
Middle School Certificate	2.566(0.896-7.344)	0.079
Primary School Certificate	1.368(0.434-4.319)	0.593
Illiterate	0.995(0.351-2.823)	0.993
Socioeconomic		
Lower Middle	0.790(0.339-1.845)	0.586
Lower	0.980(0.374-2.565)	0.967

Regression Analysis

Discussion

It is inferred from this study that from amongst the COPD group, percentage of males was more than that of females. The reported prevalence of COPD is higher among men than in women.⁽²¹⁻²³⁾ Gender (male) and increasing age are identified as risk factors in most of the studies, conducted in Asia.^(24,25) In India, prevalence rates, varying between about 2-22% in men and between 1.2-19% in women, have been shown by different reports.⁽²⁶⁾ In our study 34.66% of patients with COPD were female. This may reflect the trend of increasing prevalence of COPD in females as reported in recent years.⁽²⁷⁾ Studies have shown lower prevalence of COPD in females, as compared to males.⁽²⁸⁾ In a 10-year cumulative study, increasing age, smoking and bronchitis symptoms, but not gender, have been reported as risk factors for COPD.⁽²⁹⁾ In our study we found that with severity of disease, pack years were also increasing. Smoking is a major risk factor for COPD.⁽³⁰⁾ COPD can be attributed to greater prevalence of smoking among men, as well as cumulative effects of smoking, and other exposures with advancing age. Interestingly, FEV1% deterioration per year is more in female current smokers, as compared to males.⁽³¹⁾ Studies have also shown that adverse effects of smoking on respiratory system of females is more than males.⁽³²⁾ Recent reports have suggested that estrogen

and leptin increase the risk of COPD in females by causing fibrosis and airway inflammation respectively. In the present study male gender was identified as risk for COPD. The results obtained in our study can be explained on the basis that mean age of female patients was less than male patients. In young females the alveoli are protected and regenerated under the influence of estrogen and progesterone.⁽³³⁾ However, the association between smoking, gender and decline in lung function is complex and require detailed research.⁽³⁴⁾

This present study revealed a higher percentage of COPD cases in those, who were residing in urban areas. The results can be attributed to presence of stressors like smoking. Moreover the risk of COPD in urban areas is enhanced owing to environmental pollution.⁽³⁵⁾ Authors are also of the view that, improvement in rural health care facilities may partly be responsible for the trend, appearing in the present study. Since the sample size is small, the results may not be generalized. Therefore, to find out conclusive evidence, a multi-centric study with a larger sample size is sine qua non. Another promising area of research seems to be the reported rural urban divide in the prevalence of chronic bronchitis.⁽³⁶⁾ Nevertheless; it appears promising that COPD has been accorded priority as it has been included in rural and urban health missions' non

communicable disease list.⁽³⁷⁾

In this Study, an overall higher percentage of COPD cases belonged to middle, lower middle and lower class. A low socioeconomic status has been an important factor in several epidemiological studies.⁽³⁸⁾ Low socioeconomic status has been listed as a risk factor for development of COPD.⁽³⁹⁻⁴¹⁾ Jindal S. K *et al*, 2006, reported in a study that 32.3 per cent belonged to Low, 58.8 per cent to middle and 8.9 per cent to high socioeconomic group.⁽⁴²⁾ The higher percentage of COPD cases in persons of a low socioeconomic status may be attributed to use of biomass fuel. Link between biomass fuel, occupational pollution, low socioeconomic status and COPD have been observed in several studies.⁽⁴³⁾ Van Gemret F *et al*, 2016, found association between COPD and socioeconomic factors. The above study also identified marital status and use of biomass fuel as associated factors in male COPD patients. In females history of smoking was identified as associated factor with COPD.⁽⁴⁴⁾ Thus, identification of specific factors related with socioeconomic status and gender of COPD patients will yield informative and useful data.

In the present Study, the percentage of COPD subjects with lower education levels was higher. The higher percentage may be attributed to low level of awareness about the hazards of smoking, poor personal hygiene and lack of awareness about health issues. Studies have suggested positive association of prevalence of COPD and low level of education.⁽⁴⁵⁾ Others have suggested that low education level is a risk factor for COPD, independent of smoking status.⁽⁴⁶⁾ The percentage of subjects with COPD was higher in low education and socioeconomic class but the results were statistically insignificant. This may be attributed to less sample size in our study. Studies with larger sample size have shown significant association of low education and low socioeconomic status with COPD.⁽⁴⁷⁾

The Hospital in which the present study was conducted is located in the area which is surrounded by villages and is few kilometers away from main city. Thus, it is expected that majority of patient load on a given day will be from the surrounding areas. This is also a bias in the present study.

Interestingly, number of chronic and inflammatory diseases may result from stressors, related with socioeconomic status, which in turn leads to changes at molecular levels.⁽⁴⁷⁾ Thus, the assessment of inflammatory bio-markers in various socioeconomic classes and their association with COPD will yield informative data.

Conclusion and Limitation

In conclusion, it may be said that the gender, socioeconomic status and education are risk factors in COPD. The identification of risk factors will help the health providers and community level health workers to impart better health care facilities and counseling. The

Government also needs to look into this aspect and introduce widespread awareness programs. Identification of "At Risk" population is required. Since the sample size is small thus results can't be generalized. Further studies, if done on a larger scale and at multi-centric level will yield more information. Detail history of smoking and exposure to pollution (both indoor and outdoor) will yield conclusive data.

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