

ORIGINAL ARTICLE

Prevalence of COPD in rural population, MuzaffarnagarRahul Chaturvedi¹, Khursheed Muzammil², Nirankar Singh³, Sanjeev Davey⁴, Jai Veer Singh⁵¹Post Graduate 3rd Year, ^{2,3}Professor, ⁴Assistant Professor, ⁵Professor and Head, Department Community Medicine, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh-251203, India

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Corresponding Author

Address for Correspondence: Dr Rahul Chaturvedi, PG resident, Department of Community Medicine, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh-251203, India

E Mail ID: dr.rahulchaturvedi@gmail.com**Citation**

Chaturvedi R, Muzammil K, Singh N, Davey S, Singh JV. Prevalence of COPD in rural population, Muzaffarnagar. Indian J Comm Health. 2015; 27, 4: 467-471.

Source of Funding: Nil **Conflict of Interest:** None declared**Article Cycle****Submission:** 30/08/2015; **Revision:** 20/09/2015; **Acceptance:** 15/12/2015; **Publication:** 31/12/2015**Abstract****Background:** Chronic Obstructive Pulmonary Disease (COPD) is a life-threatening lung disease that interferes with normal breathing – it is more than a “smoker’s cough”. Recently, Chronic Obstructive Pulmonary Disease (COPD) has gained interest as a major public health concern and is currently the focus of intense research because of its persistently increasing prevalence, mortality, and disease burden in countries of high, middle and low income.**Objective:** 1) To assess the prevalence of COPD in 30 years and above in rural catchment of bilaspur which is field practice area of MMC. 2) To study the risk factors associated with COPD in a Study population**Material and Methods:** Study Area: The study was conducted in catchment area of Rural Health Training Center, which is a field practice area of the department of community medicine, Muzaffarnagar Medical college, Muzaffarnagar, having 1323 registered families with population of 1425. Study design: cross-sectional Study period: carried out between 1st April 2014 to 31st March 2015. **Results:** In the present study, the symptoms of chronic bronchitis were reported by 71 (7.8%) subjects. Out of these only 62 had an airflow limitation based on low FEV1/FVC ratio on spirometry.**Conclusion** The present study also showed that bidi smoking was more prevalent in the economically underprivileged and those with low educational status due to affordability factor. Bidi smoking was more harmful than cigarette smoking in causation of COPD in the present study. Smoking anytime in life increased the chances of COPD 13 folds**Key Words**

COPD; Chronic Bronchitis

Introduction

Chronic obstructive pulmonary disease (COPD) is a lung ailment that is characterized by a persistent blockage of airflow from the lungs. It is an under-diagnosed, life-threatening lung disease that interferes with normal breathing and is not fully reversible. The more familiar terms of chronic bronchitis and emphysema are no longer used; they are now included within the COPD. (1) Chronic obstructive pulmonary disease (COPD) is a preventable and treatable disease state characterized by airflow limitation that is not fully reversible. Chronic bronchitis is defined clinically as

chronic productive cough for 3 months in each of 2 successive years in a patient in whom other causes of productive chronic cough have been excluded. (2) Emphysema is defined pathologically as the presence of permanent enlargement of the airspaces distal to the terminal bronchioles, accompanied by destruction of their walls and without obvious fibrosis. (3) In patients with COPD either of those conditions may be present. Asthma differs from COPD in its pathogenic and therapeutic response, and should therefore be considered a different clinical entity (3).

Global Burden of COPD: In 2001, COPD was the fifth leading in cause of death in high income countries accounting for 3.8% of the total deaths and it was the sixth leading cause of death in the nations of low and middle income, accounting for 4.9% of the total deaths. Overall COPD was responsible for 4.8% of total deaths in the world in 2001. (4) It is expected to be the third leading cause of death worldwide by 2020. (5,6) The Global Burden of Disease Study estimated that in 1990, the worldwide prevalence of COPD was 9.34 per 1000 males and 7.33 per 1000 females. (7,8) In 1994, there were more than 52 million individuals around the world suffering from COPD.

Social and economic impact of COPD: It is projected to be the fifth leading cause of DALYS by 2020 accounting for 57.6 million DALYS worldwide and 52.7 million DALYs in developing regions. (9) In the European Union, the total direct costs of COPD accounts to about 38.6 billion Euros. (10) In the United States in 2002, the direct costs of COPD were \$ 14.1 billion. (11)

Burden of COPD in India: COPD is a major cause of morbidity and mortality in India too. In a recent 2005 estimate in India. Chronic respiratory disease was shown to account for 7% of deaths and 3% of DALYs lost. (12) In a review of different Indian studies the total burden due to COPD was calculated to be 8.15 million male and 4.21 million female patients in a population of 944.5 million in 1996. (13) In most non TB chest clinics COPD constitutes 25-30% of the cases. The prevalence in general population varies widely from 1% in urban non-smokers to 21% of the rural smokers. (14,15)

Health planners need to get ready to face a caseload of about 222.16 lakh COPD in 2016 a majority of which would be from rural areas where the poverty levels are high. (16)

Aims & Objectives

1. To assess the prevalence of COPD in 30 years and above population in rural catchment of Bilaspur which is a field practice area of Muzaffarnagar Medical College.
2. To identify the risk factors associated with COPD in the study population

Material and Methods

In rural areas of Muzaffarnagar bidi smoking has emerged as an important factor for causation of COPD. Therefore, for estimating the prevalence of

COPD and risk factors associated with it, simple random sampling was applied in the population.

The study was done with following methods: **Study Area:** The study was conducted in catchment area of Rural Health Training Center, which is a field practice area of the department of community medicine, Muzaffarnagar Medical college, Muzaffarnagar, having 1323 registered families with population of 14250. **Study Subjects:** Comprised with people of 30 years and above. **Study Design:** Cross-sectional. **Study Period:** Carried out between 1st April 2014 to 31st March 2015.

The following inclusion and exclusion criteria was adopted in study:

Inclusion criteria

1. People (males and females) residing for at least 3 year in above mentioned area.
2. Aged 30 years and above.
3. People who gave informed consent.
4. People found fit for performing spirometry.

Exclusion criteria

1. People who were documented cases of other chronic respiratory illnesses like bronchiectasis, cystic fibrosis.
2. People who did not give informed consent.

Enrollment: people residing in the above area and meeting the above inclusion criteria were enrolled in the study.

Sampling: Simple random sampling

Sample size: The sample size for the study was 900 patients. This was based on the assumptions i.e. 10% people were suffering from COPD in the population, with 20% permissible error and level of significance 5%(α)

Formula used: $n = 4PQ/L^2$

Where P= proportion of people having COPD, Q=(100-P), L= affordable error (20% of p)

$n = 4 \times 10 \times (100-10) / 2^2 = 900$

Methodology:

- a. A house to house survey was conducted in all the registered families of rural field practice area of department of community medicine Muzaffarnagar Medical college and hospital Muzaffarnagar.
- b. Listing of household having people 30 years of age and above was done in order to select the study subject from the list prepared. The first household was selected randomly by lottery method to start with, after that next household was selected on alternate basis till the desired sample size was achieved

DIGNOSTIC CRITERIA OF COPD AND RESTRICTIVE LUNG DISEASE:

- 1.FVC
- 2.FEV1
- 3.FEV1/FVC ratio

C) CLASSIFICATION OF SEVERITY OF COPD5

Stage	FEV ₁ /FVC ratio	Post bronchodilator FEV ₁
0: At risk	Normal spirometry	---
1: mild COPD	<70%	≥ 80% predicted
2: Moderate COPD	<70%	50% ≤ FEV ₁ <80% predicted
3: Severe COPD	<70%	30% ≤ FEV ₁ <50% predicted
4: Very severe COPD	<70%	FEV ₁ < 30% predicted

Results

The study was conducted by house-to-house survey in Bilaspur village, the rural field practice area of Community Medicine Muzaffarnagar Medical college Muzaffarnagar UP. A total of 1011 subjects were contacted during the study period. 73 subjects declined to give consent for the study and were excluded accordingly. Out of 938 (92.7%) subjects who were studied, 30 subjects could not perform spirometry and were excluded from the final analysis. Hence the final sample consisted of 908 subjects.

The maximum number of subjects belonged to the age group of 30-40 Years (35.7%) followed by 40-50 years (29.6%). The age group 70 and above years constituted only 4.7% of the population. The age ranged from 30 to 90 years (range 60 years). Mean age of the subjects was 44.88 ± 11.7 years. The study subjects were almost equally distributed with respect to their gender with males comprising 51.8% of the sample and females 48.2%. ([Table 1](#))

The prevalence of COPD increased with increasing age of the subjects. Only 3.4 % of subjects in age group 30-40 years had COPD which increased to 13.6% in 60-70 years and 20.9% in 70 years and above. Maximum number of COPD cases were seen in those 50 years and above subjects with an estimated prevalence of 13.3%. A significant association (p<0.001) was seen between increasing age and prevalence of COPD. ([Table 2](#))

Majority of cases of COPD were seen in lower socioeconomic class with the prevalence being 11.36% and 7.0% in Class V and Class IV socioeconomic class respectively. 5.26% in Class III had COPD 15.38% and 3 10.0% cases were seen in Class I and class II. There was no significant association of COPD with socioeconomic status (P>0.05) ([Table 3](#))

COPD was diagnosed in 24.5% of the currently smoking subjects in comparison to only 2.5% in nonsmokers. This was found to be higher in females

(37.5%) than males (21.3%). There was no statistical significance in gender-wise prevalence of COPD in currently smoking subjects. However current smoking was significantly associated with COPD in both sexes (p<0.01). ([Table 4](#))

The overall prevalence of COPD was 11.9% in ex-smokers in comparison to only 1.3% in the never smokers. This was higher in males (14.3%) as compared to females (7.1%). Smoking in the past was significantly associated with COPD in both males (p<0.001) and females (p<0.01). There was no statistical difference in gender-wise occurrence of COPD in ex-smokers ([Table 5](#))

20.8% reported smoking bidi and 2.7% cigarette anytime in life out of total population. The prevalence of COPD was found to be 36.0% and 15.6% in exclusive cigarette and bidi smokers respectively. No case was found in 4 exclusive hookah smokers. Those smoking a combination of bidi, cigarette or hookah had a prevalence (14.7%) lower than those smoking either form exclusively. The association between COPD and type of smoking was significant (p<0.01) ([Table 6](#))

Discussion

In studies conducted by Malik *et al* (15) and Jindal *et al* (14) in North India the diagnosis was based on clinical assessment. Objective assessment of the airflow obstruction by measuring the peak expiratory flow rate (PEFR) done in Studies by Malik *et al* (15) and Jindal *et al* (14). In a review of different population based studies (13-15) from India, SK Jindal et al found that prevalence rates in above 30 years population in male subjects varied from 2.1% to 9.4% in studies from North India and 1.4% to 4.1% in studies from South India. The respective figures for females were 1.3% to 4.9% in North India and 2.5% to 2.7% in South India. Assessment of airflow limitation by spirometry has not been reported in a general population survey in India The current study was a community based cross sectional study undertaken with the objectives to study the prevalence of chronic obstructive pulmonary disease (COPD) among population 30 years and above and to identify the risk factors associated with the disease in the study population. The study also tried to investigate the treatment seeking behavior in those patients who were suffering from the disease. The study was carried out in RHTC bilaspur which is a field practice area of Muzaffarnagar medical college for a period of 12 months through a house to house survey. Muzaffarnagar being an industrial area is surrounded by various industries like Iron casting, sugar mills, copper industry, paper mill chances of exposure to harmful heavy metals are high and contributed significantly in causing disease in people residing nearby bilaspur village of district Muzaffarnagar

Conclusion

From the total population a total of 908 subjects were observed and study was carried out on them COPD prevalence came out 7.49% and it was almost twice more common in males than females.

The present study also showed that bidi smoking was more prevalent in the economically underprivileged and those with low educational status due to affordability factor. Bidi smoking was more harmful than cigarette smoking in causation of COPD in the present study. Smoking anytime in life increased the chances of COPD up to 13 folds. The risk of occurrence was directly related to the total amount of exposure to the tobacco smoke i.e. the total number of bidis or cigarettes smoked per day and duration of smoking. This was found to be an independent risk factor, even after adjusting for other factors. It is recommended to have a screening programme for the elderly above age of 60 years with special focus on those exposed to risk factors to diagnose the disease at the earliest and initiate appropriate management.

Recommendation

Bidi being more harmful than cigarette, it is time to relook at some of the tobacco control policies. While the cigarette packets carry a statutory warning about their harmful effects, bidi packs do not carry any such warning. So it is recommended to make necessary provisions to highlight the potential hazards of bidi smoking to the consumers. Also to make these warning on the packets to be more explicit for the illiterate and underprivileged people specifically designed health education programmes aimed at reducing the smoking habit should be focused in underprivileged populations and people with low educational status.

Authors Contribution

All authors have contributed equally.

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Tables

TABLE 1 DISTRIBUTION OF STUDY SUBJECTS BY AGE AND SEX (N=908)

	MALE		FEMALE		TOTAL	PERCENTAGE
DOMAIN	470	51.8%	438	48.2%	908	
AGE CATEGORIES						
30-40	167	35.5	157	35.8	324	35.7
40-50	135	28.7	134	30.7	269	29.6
50-60	67	14.3	80	18.2	147	16.2
60-70	67	14.3	58	13.3	125	13.8
70 & ABOVE	34	7.2	9	2.1	43	4.7

TABLE 2 AGE SPECIFIC PREVALENCE OF COPD IN THE STUDY SUBJECTS (N=908)

AGE	N(908)	NO OF PATIENT WITH COPD	NO OF PATIENT WITHOUT COPD	PREVALANCE OF COPD
30-40	324	11	313	3.4%
40-50	269	14	255	5.2%
50-60	147	17	130	11.6%
60-70	125	17	108	13.6%
70& ABOVE	43	9	34	20.9%
TOTAL	908	68	840	7.5%

X²=31.53 at DF=4 The P value is <0.000001. The result is significant at p<0.01

TABLE 3 PREVALENCE OF COPD ACCORDING TO THE SOCIOECONOMIC STATUS (N=908)

SOCIAL CLASS*	N = (908)	NO.OF PT. WITH COPD	NO OF PT. WITHOUT COPD	PREVALANCE OF COPD (%)
I	13	2	11	15.4
II	30	3	27	10.0
III	190	10	180	5.3
IV	543	38	505	7.0
V	132	15	117	11.4

X²=4.78 at DF= 4. The P value is 0.310625.p>0.05

TABLE 4 PREVALENCE OF COPD IN CURRENTLY SMOKING SUBJECTS

CURRENTLY SMOKING	N(908)	NO OF PT WITH COPD	NO OF PT WITHOUT COPD	PREVALANCE OF COPD(%)
YES	204	50	154	24.51
NO	704	18	686	2.56
TOTAL	908	68	840	7.49

X²=47.64 at DF=1. The P-value is <0.00001. The result is significant at p<0.01

TABLE 5 GENDER-WISE PREVALENCE OF COPD IN EX-SMOKERS

Ex-smoker	Male			female			Total		PREVALANCE OF COPD (%)
	N	WITH COPD	WITHOUT COPD	N	WITH COPD	WITHOUT COPD	N	WITH COPD	
YES	56	8	48	28	2	26	84	10	11.9
NO	250	3	247	370	5	365	620	8	1.3
TOTAL	306	11	295	398	7	391	704	18	2.6

X²=19.33 at DF=1The P-value is 1.3. The result is significant at p<.01

TABLE 6 PREVALENCE OF COPD WITH RESPECT TO THE TYPE OF SMOKING HABIT (N=908)

TYPE OF SMOKING HABBIT	N(908)	NO OF PT WITH COPD	NO OF PT WITHOUT COPD	PREVALANCE OF COPD
NO EXPOSURE	552	8	544	1.4
CIGARETTE	25	9	16	36
BIDI	256	40	216	15.6
MIXED	75	11	64	14.7
TOTAL	908	68	840	7.5