



PREVALENCE OF COPD AND ITS ASSOCIATED FACTORS IN ADULTS IN URBAN SLUMS OF MEERUT: A CROSS-SECTIONAL STUDY.

Community Medicine

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ABSTRACT

Background: Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death worldwide, particularly in low- and middle-income countries where exposure to tobacco smoke and biomass fuels is prevalent. Urban slums, characterized by overcrowding and poor ventilation, amplify these risks. **Objectives:** 1) To find out the prevalence of COPD. 2) To find out the association of COPD with age, gender and smoking status. **Material & Methods:** A cross-sectional study was conducted on 277 adults aged 35 years and above residing under the area covered by Urban Health Training Centre, Government Medical College Meerut, Uttar Pradesh from July 2023 to December 2023. Results: Out of 277 participants, 40 individuals fell into the GOLD 2 category, indicating moderate COPD with FEV1 values between 50% and 80% of predicted, overall prevalence of COPD was 14.4%. The Prevalence of COPD was 21.7% among males and 9.3% among females. Among smokers, 33.3% had COPD, while among non-smokers, 5.3% had COPD. **Conclusion:** COPD rates increased with age, peaking in the 50-54 age groups and remaining high in older groups. Males showed a higher prevalence of COPD compared to females. Smokers had higher prevalence of COPD as compared to nonsmokers.

KEYWORDS

COPD, GOLD Criteria, Urban slum, Tobacco Smoke

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) has a global impact, affecting 210 million individuals and claiming the lives of over 4 million people annually, constituting approximately 9% of total global deaths. 1 Notably, ninety percent of these fatalities transpire in low- and middle-income nations, forecasting COPD 2 to become the third leading cause of death by 2030. The persistent nature of COPD disrupts conventional social roles, diminishes work capacity, and imposes substantial burdens in terms of both direct and indirect costs.^[1-4]

Chronic Obstructive Pulmonary Disease (COPD) is defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) as a condition marked by persistent airflow limitation that is not fully reversible.^[5]

The dense population in urban centers exacerbates the problem, leading to crowded living conditions and limited access to green spaces. The lack of proper urban planning and inadequate enforcement of environmental regulations contribute to the degradation of air quality, adversely affecting the respiratory health of the population. Additionally, the prevalence of smoking, both active and passive, is notably high in urban areas, further amplifying the risk of COPD.^[6]

COPD in Adults (30 Years and above) of Urban Slums of Meerut" is strategically poised to unravel the intricate web of factors influencing the prevalence of COPD among a particularly vulnerable segment of the population.

Objectives

- 1) To find out the prevalence of COPD.
- 2) To find out the association of COPD with age, gender and smoking status.

MATERIAL & METHODS

Study Design: A cross-sectional study was conducted in the urban slums of Meerut to achieve the objectives outlined.

Study Period: The study was carried out from July 2023 to December 2023 which was used for data collection, compilation and presentation of findings.

Sampling Methods

The study was conducted among the adult population aged 30 years and above, in an urban slum of Meerut to assess the prevalence of

COPD. The study began with the acquisition of a complete list of urban slums in Meerut, provided by the concerned authority. From this list, one slum was randomly selected. The list and the population data for the selected slum area were obtained from municipal authorities. The desired number of participants was then determined from each locality according to the proportion of their population. In each locality, a household survey was initiated from the center of the locality, and the direction of the survey was decided by the pencil tip method. All the adjacent households were surveyed, and eligible members present in the household were interviewed. If more than one member was available, one member was chosen using the lottery method. This procedure was continued until the desired sample size was achieved. Selected candidates were interviewed using a pretested and pre-designed questionnaire. The data thus obtained were tabulated and analyzed using appropriate statistical software.

Study Area: The study took place in the urban slums of Meerut, chosen due to their high population density and potential elevated risk for COPD.

Study Population: Adults aged 30 years and above. Data collected was entered into MS Excel database and analyzed using statistical software Epi info version 7.

Results

Table 1- Overall Prevalence of COPD

GOLD Criteria	FEV1	COPD		Total No. (%)
		Present No. (%)	Absent No. (%)	
GOLD -1 MILD	FEV1 > 80%	32 (13.5)	205 (86.5)	237 (85.6)
GOLD- 2 MODERATE	FEV1 50 - 80% MODRATE	8 (20)	32 (80)	40 (14.4)
GOLD- 3 SEVERE	FEV1 30 - 50% SEVERE	NIL	-	-
GOLD- 4 VERY SEVERE	FEV1 < 30 % VERY SEVERE	NIL	-	-
Total		40 (14.4)	237 (85.6)	277 (100.0)

Table 1 illustrate that's The Global Initiative for Chronic Obstructive Lung Disease (GOLD) classification system categorizes airflow limitation severity in patients with Chronic Obstructive Pulmonary Disease (COPD) based on their Forced Expiratory Volume in one second (FEV1) percentage predicted. In a recent study, a total of 277

individuals were assessed for COPD presence and severity according to the GOLD criteria. Among them, 40 individuals fell into the GOLD 2 category, indicating moderate COPD with FEV1 values between 50% and 80% of predicted. This group constituted 14.4% of the total sample. No individuals met the criteria for GOLD 3 (severe COPD, FEV1 30-50%) or GOLD 4 (very severe COPD, FEV1 < 30%) in this study cohort. This study underscores the variability in COPD severity among populations and the importance of individualized management strategies based on established guidelines such as those provided by GOLD.

Table 2- Association of Age Groups with COPD

Age (in years)	COPD		Total No. (%)
	Present No. (%)	Absent No. (%)	
35 - 39	3 (4.8)	60 (95.2)	63 (22.7)
40 - 44	5 (9.8)	46 (90.2)	51 (18.4)
45 - 49	8 (12.7)	55 (87.3)	63 (22.7)
50 - 54	13 (18.3)	58 (81.7)	71 (25.7)
55 - 59	10 (3.8)	16 (61.5)	26 (9.4)
60 +	1 (33.3)	2 (66.7)	3 (1.1)
Total	40 (14.4)	237 (85.6)	277 (100.0)

$\chi^2 = 19.0395$, $df = 5$, $P = .000772$ Significant

The above table illustrates the association between age group and the presence of COPD. It presents data on six age groups: 35-39, 40-44, 45-49, 50-54, 55-59, and 60 and above. The table shows the number and percentage of individuals with and without COPD in each age group. In the 35-39 age group, 4.8% had COPD, while 95.2% did not. In the 40-44 age group, 9.8% had COPD, and 90.2% did not, making a total of 51. In the 45-49 age group, 12.7% had COPD, and 87.3% did not, from a total of 63. For the 50-54 age group, 18.3% had COPD, and 81.7% did not, out of a total of 71. In the 55-59 age group, 3.8% had COPD, and 61.5% did not, from a total of 26. Lastly, in the 60 and above age group, 33.3% had COPD, while 66.7% did not, from a total of 3. Overall, out of a total of 277 individuals, 40 (14.4%) had COPD, while 237 (85.6%) did not. The statistical test results indicate a significant association between age and COPD.

Table 3- Association of Gender with COPD

Gender	COPD		Total No. (%)
	Present No. (%)	Absent No. (%)	
Male	25 (21.7)	90 (78.3)	115 (41.5)
Female	15 (9.3)	147 (90.7)	162 (58.5)
Total	40 (14.4)	237 (85.6)	277 (100.0)

$\chi^2 = 8.478$, $df = 1$, $P = 0.0036$, significant

The above table illustrates that among males, there were 21.7% cases of COPD-positive and 78.3% cases of COPD-negative, making up a total of individuals, which accounts for 41.5% of the total population. Conversely, among females, there were 9.3% cases of COPD-positive and 90.7% cases of COPD-negative, totaling 162 individuals, representing 58.5% of the total. Overall, there were 14.4% COPD-positive cases and 85.6% COPD-negative cases. The association between gender and COPD was found to be statistically significant.

Table 4- Association of COPD in Relation to Smoking status

Smoking Status	COPD		Total No. (%)
	Present No. (%)	Absent No. (%)	
Smoker	30 (33.3)	60 (66.7)	90 (32.5)
Non-Smoker	10 (5.3)	177 (94.7)	187 (67.5)
Total	40 (14.4)	237 (85.6)	277 (100.0)

$\chi^2 = 38.515$, $df = 1$, $P = 0.0001$, Significant

Table 4 presents data on smoking status and the presence of Chronic Obstructive Pulmonary Disease (COPD). Out of a total of 277 individuals, (90) 32.5% are smokers and (187) 67.5% are non-smokers. Among smokers, (30) 33.3% had COPD, while among non-smokers, (10) 5.3% had COPD. This yields a percentage distribution of 32.5% for smokers and 67.5% for non-smokers. Overall, the table indicates a significant association between smoking and COPD, with a higher proportion of COPD cases

observed among smokers compared to nonsmokers.

DISCUSSION

In the present study, prevalence of COPD among population aged 30 years and above was 14.4%. Study done by Verma A et al. (2021)^[7] revealed that the prevalence of COPD among population aged 30 years and above was 7.0%.

The prevalence of COPD was shown to rise with age, beginning at 4.8% in the 35-39 age group. It increased to 9.8% for those aged 40 to 44 years, 12.7% for those aged 45 to 49 years, and 18.3% for those aged 50 to 54 years. The highest prevalence was observed in the 55-59 years age group, with 38.5%. 33.3% of those over the age of 60 were diagnosed with COPD. A similar study done by Cai L et al. (2020)^[8] the prevalence of COPD increases progressively with age. Among individuals aged 35-39 years, the prevalence is 8.3%, rising slightly to 8.9% in the 40-49 age group. It further increases to 11.2% in those aged 50-59 years and reaches 15.9% among individuals aged 60-69 years. For those aged 70 years and older, the prevalence is the highest at 21.3%. This trend demonstrates a clear age-related increase in the prevalence of COPD.

In the present study we observed that the Prevalence of COPD was 21.7% among males and 9.3% among females. Study done by Mahesh PA et al. (2009)^[9] revealed that males had a higher prevalence (11.1%) compared to females (4.5%).

In the present study we observed that among smokers, 33.3% had COPD, while among non-smokers, 5.3% had COPD. The study done by Cai L et al. (2020)^[8] among smokers 19.2% had COPD, while among non smokers 10.9% had COPD.

CONCLUSION

Study found a significant association between age and COPD prevalence. COPD rates increased with age, peaking in the 50-54 age group (18.3%) and remaining high in older groups. This trend highlights the cumulative effect of risk factors over time. Males showed a higher prevalence of COPD (21.7%) compared to females (9.25%). This gender disparity may be attributed to differences in exposure to risk factors such as smoking and occupational hazards. Smokers had higher prevalence of COPD as compared to nonsmokers.

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