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# Correlation of risk factors with COPD and study of clinical demographic and radiological profile of COPD patients

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## Abstract

**Background:** Chronic obstructive pulmonary disease (COPD) affects 210 million people worldwide and kills > 4 million people every year, accounting for around 9% of total deaths. Ninety percent of these deaths occur in low- and middle-income countries. It is projected to be the 3rd leading cause of death by 2030. Its chronic nature causes disruption of normal social roles, reduced workability, and poses massive burden on direct and indirect costs. According to the World Health Organization report, the prevalence of COPD ranges between 4% and 20% in the Indian adults. **Aim & Objective:** 1.To study different risk factors in COPD patients in study.2To study clinical, demographic and radiological profile of COPD patients in study **Methods: Study design:** Prospective Observational Study. **Study setting:** Respiratory ward of tertiary care center. **Study population:** The study population included all the cases with COPD admitted at a tertiary care center. **Sample size:** 200 **Results:** majority of study participants belongs to the age group of 51-60 years e.g 67 cases (33.50%) followed by 41-50 years 54 (27%), 48 (24%) cases found in 31-40 years age group and 31 (15.50%) cases was found in 18-30 years age group. majority of study participants were males contributing 138 (69%) and Females 62 (31%). majority of cases associated with HTN 61 (30.50%) followed by Asthma 47 (23.50%), 28 cases found no associated comorbidity, 27 cases had a history of DM, Anxiety found in 12 (6%) and Rhinitis found in 17 (8.50%). There is statistically highly significant association between age and Chronic Bronchitis. There is statistically significant association between Emphysema with gender. **Conclusions:** High prevalence of COPD was found in males.Majority of cases found with Chronic Bronchitis.There is statistically highly significant association between age and Chronic Bronchitis.There is statistically significant association between Emphysema with gender

**Keywords:** COPD, Burden of Obstructive Lung Disease, spirometry, FEV1/FVC ratio

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## Introduction

Chronic obstructive pulmonary disease (COPD) affects 210 million people worldwide and kills > 4 million people every year, accounting for around 9% of total deaths. Ninety percent of these deaths occur in low- and middle-income countries. It is projected to be the 3rd leading cause of death by 2030.[1] Its chronic nature causes disruption of normal social roles, reduced workability, and poses massive burden on direct and indirect costs.[2]

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Different definitions used for COPD in epidemiological studies preclude getting a reliable prevalence estimate. Traditionally, in community-based studies, chronic bronchitis (CB) is used as a proxy to measure COPD owing to its relative ease of diagnosis. CB is defined as cough with expectoration occurring on most days for at least 3 months in a year for at least 2 consecutive years whereas, COPD is defined as this plus spirometric evidence of airway obstruction.[3]

According to the World Health Organization report, the prevalence of COPD ranges between 4% and 20% in the Indian adults.[1] According to a recent systematic review[4] which includes estimates from the INSEARCH and other major studies in India, the prevalence of CB seems to range between 6.5% and 7.7% in rural and up to 9.9% in urban India. The review also mentions that the included studies were mostly low quality, questionnaire-based and was conducted around 1990–2006.

These figures may underestimate the true burden of COPD since questionnaire-based prevalence estimates tend to be lower than the true spirometry-based estimates.[5] This review provides the best available estimate of COPD prevalence till date but is unlikely to reflect the current disease burden across all Indian subpopulations.[4]

As the current prevalence of COPD in India is unclear, rigorous estimates are required using standard epidemiological methods, to develop optimal strategies for disease control.

**Need for the study:**

According to the World Health Organization, COPD is the fourth leading cause of death in the world, with approximately 2.75 million deaths per annum, or 4.8% of deaths. In Europe, mortality rates vary from country to country: ,20 per 100,000 population in Greece, Sweden, Iceland and Norway, up to more than 80 per 100,000 population in Ukraine and in Romania. In France, the mortality rate is approximately 40
deaths per 100,000 population [5].

In developing countries, mortality is also on the increase, in relation to the increase in cigarette smoking. In China, tobacco is responsible for 12% of deaths, with projections which show that this rate could reach 30% in 2030 [6]. Mortality from COPD is higher in males and increases with age in those over 45 yrs old. Mortality also increases with severity of disease. In the USA, within the framework of the National Health and Nutrition Examination Survey (NHANES I), 1,301 deaths were analysed in a cohort of 5,542 adults.

Very few studies conducted in Maharashtra regarding Study of Risk factors, clinical demographic and radiological profile of COPD patients in tertiary care center. So I am interested to find out the various risk factors of COPD, clinical profile, Demographic profile, incidence of various risk factors of COPD and association of various risk factors with COPD

## Aim And Objective

**Objective:**

1. To study clinical, demographic and radiological profile of COPD patients in study.
2. To study the association of various risk factors with COPD

## Material And Methods

**Study design:** Prospective Observational Study. **Study setting:** Respiratory ward of tertiary care centre. **Study population:** The study population included all the cases with COPD admitted at a tertiary care center.

**Inclusion Criteria:**

1. Patients diagnosed to have COPD as per GOLD guidelines criteria.
2. Patients of COPD admitted in Medicine wards and attending COPD OPD.
3. Patients of COPD with history of smoking/not smoking
4. Adult patients more than 18 years of age

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**Exclusion Criteria:**

1. All the patients <18 and more than 60 years of age
2. All patients not willing to participate in the study
3. Patients who do not undergo radiological investigations
4. Patients not fulfilling GOLD guidelines criteria.
5. Patient who do not perform acceptable spirometry.

**Approval for the study:**

Written approval from Institutional Ethics committee was obtained beforehand. Written approval of Respiratory medicine and Related department was obtained. After obtaining informed verbal consent from all patients with the definitive diagnosis of COPD admitted to respiratory ward of tertiary care centre such cases were included in the study.

**Sample Size Calculation:** With reference to study by **Sinha B et al (2017)[15]** He found that the Prevalence of Smoker among COPD cases was 38%

**Formula for sample size** = 4* P* Q / L2

**Where P** = 38%

**Q** = 100 -38 = 62

**L** = Allowable error = 20% (Absolute error)

**Sample size** = 4 * 38 * 62 / 57.76 =163.15

**Sample size Rounded to** = 200

**Sampling technique:** Convenient sampling technique used for data collection. All patients admitted in the respiratory Medicine department of tertiary care center from…..to…..with COPD were included in the study.

**Methods of Data Collection and Questionnaire-**

Predesigned and pretested questionnaire was used to record the necessary information. Questionnaires included general information, such as age, sex, religion, occupation of parents, residential address, and date of admission. Medical history- chief complain, past history, general examination, systemic examination

Data on demographic profile, Radiological profile of COPD patient, investigation, personal history, medical past history, treatment modalities, and clinical outcome data collected from patients admitted in medicine ward.

All the procedures and investigations conducted under direct guidance and supervision of pg guide. Proforma of COPD notes maintained.

**Screening procedure:**

History of patients including presenting complaints, medical illness, drug history, personal history, past medical history.All eligible subjects completed a questionnaire used to collect demographic data and information on factors that are potentially associated with COPD (smoking history, smoking habits and respiratory symptoms).

Spirometry was performed according to the American Thoracic Society (ATS) criteria by trained physicians using a spirometer with subjects in a seated position. Two separate measurements were made, one before and one at least 15 minutes after two puffs of salbutamol (400 μg) using a metered-dose inhaler with a spacer. Two investigators independently assessed the quality of the flow-volume curves and time-volume curves according to ATS criteria [62]

Stages of disease severity were classified according to GOLD guidelines. Stages of disease severity were classified as follows: mild (stage I) with FEV1>70%; moderate (stage II) with FEV1 50% to 70%; and severe (stage III) with FEV1<50% [63]

**Data entry and analysis:**

The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency

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tables and correlation of COPD. $p<0.05$ was considered as level of significance using the Chi-square test

**Results And Observations**

The present prospective study was done among 200 cases of COPD admitted to tertiary care centre during study period.

**Table 1: Distribution of cases according to Age (N=200)**

| Age | Frequency | Percentage |
|---|---|---|
| 18-30 | 31 | 15.50% |
| 31-40 | 48 | 24% |
| 41- 50 | 54 | 27% |
| 51-60 | 67 | 33.50% |
| **Total** | **200** | **200 (100%)** |

Above table shows that Distribution of cases according to Age (N=200) majority of study participants belongs to the age group of 51-60 years e.g 67 cases (33.50%) followed by 41-50 years 54 (27%), 48 (24%) cases found in 31-40 years age group and 31 (15.50%) cases was found in 18-30 years age group.

**Table 2: Distribution of cases according to Gender (N=200)**

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 138 | 69% |
| Female | 62 | 31% |
| **Total** | **200** | **200 (100%)** |

Above table shows that Distribution of cases according to Gender (N=200) majority of study participants were males contributing 138 (69%) and Females 62 (31%)

**Table 3: Distribution of COPD cases according to Pulmonary Disease (N=200)**

| COPD | Frequency | Percentage |
|---|---|---|
| Chronic Bronchitis | 117 | 58.50% |
| Emphysema | 83 | 41.50% |
| Centrolobular Emphysema | 47 | 23.50% |
| Panlobular Emphysema | 29 | 14.50% |
| Both | 07 | 3.5% |
| **Total** | **200** | **200 (100%)** |

The above table shows Distribution of COPD cases according to Pulmonary Disease (N=200) majority of cases found with Chronic Bronchitis 117 (58.50%) dignosed by clinically/Radiologically followed by Emphysema 83 (41.50%) out of 83 cases of Emphysema Centrolobular Emphysema found in 47 (23.50%), Panlobular Emphysema 29 (14.50%) and Both two type was found in 7 cases (3.50%). All cases diagnosed by Clinical examination and Confirmed by Radiological examination.

**Table 4: Distribution of cases according to associated Comorbidity (N=200)**

| Associated Comorbidity | Frequency | Percentage |
|---|---|---|
| HTN | 61 | 30.50% |
| DM | 27 | 13.50% |
| Asthma | 47 | 23.50% |
| Rhinitis | 17 | 8.50% |
| Depression | 8 | 4% |
| Anxiety | 12 | 6% |
| Not associated with comorbidity | 28 | 14% |

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| | | |
|---|---|---|
| **Total** | **200** | **200 (100%)** |

The above table shows Distribution of cases according to associated Comorbidity (N=200) majority of cases associated with HTN 61 (30.50%) followed by Asthma 47 (23.50%), 28 cases found no associated comorbidity, 27 cases had a history of DM, Anxiety found in 12 (6%) and Rhinitis found in 17 (8.50%)

**Table 5: Association of cases with age**

| **Age in years** | **Chronic Bronchitis** | | | | |
|---|---|---|---|---|---|
| | **Present** | **Percentage** | **Absent** | **Percentage** | **Total** |
| 18-30 | 15 | 48.38% | 16 | 51.62% | 31(28.57%) |
| 31-40 | 20 | 41.66% | 28 | 58.33% | 48(26.42%) |
| 41-50 | 34 | 62.96% | 20 | 37.03% | 54(33.58%) |
| 51-60 | 48 | 71.64% | 19 | 28.35% | 67(11.43%) |
| **Total** | **117** | **58.50** | **83** | **41.50** | **140(100%)** |

**Chi square-10.8396, p-value-0.000994, (Row 1,2 vs Row 3 and 4 Merged)**

The result is highly significant at $p < .05$.

Inference: There is statistically highly significant association between age and Chronic Bronchitis.

**Table 6: Association of Emphysema cases with gender**

| **Gender** | **Emphysema cases** | | | | |
|---|---|---|---|---|---|
| | **Present** | **Percentage** | **Absent** | **Percentage** | **Total** |
| Male | 31 | 22.46% | 107 | 77.54% | 138(69%) |
| Female | 52 | 83.87% | 10 | 16.13% | 62(31%) |
| **Total** | **83** | **41.50%** | **117** | **58.50%** | **200 (100%)** |

**Chi-square statistic-66.447, df-1, p-value-0.00001**

The result is significant at $p < .05$.

Inference: There is statistically significant association between Emphysema with gender

**Discussion**

The present prospective study was done among 200 cases of COPD admitted to tertiary care centre during study period.

Table No. 1: Distribution of cases according to Age (N=200) majority of study participants belongs to the age group of 51-60 years e.g 67 cases (33.50%) followed by 41-50 years 54 (27%), 48 (24%) cases found in 31-40 years age group and 31 (15.50%) cases was found in 18-30 years age group. similar result found in the study conducted by Dickinson JA et al (1999)[7], Lange P et al (1989)[8], Isoaho R et al (1994)[9] Another study conducted by Sinha B et al (2017)[10] Similar result reported.

Table No. 2: Distribution of cases according to Gender (N=200) majority of study participants were males contributing 138 (69%) and Females 62 (31%).Similar result observed in the study by Peña VS et al (2000)[11] He reported high prevalence of male than female. Similar result observed in the study conducted by Sinha B et al (2017)[10] Another study reported similar result conducted by Al Ghobain M et al (2015)[12] He observed that the High prevalence of male among COPD cases. Contrast result found in the study by Ntritsos G et al (2018)[13] He observed that the high incidence of COPD in female.

Table No. 3: Distribution of COPD cases according to Pulmonary Disease (N=200) majority of cases found with Chronic Bronchitis 117 (58.50%) dignosed by clinically/Radiologically followed by Emphysema 83 (41.50%) out of 83 cases of Emphysema Centrolobular Emphysema found in 47 (23.50%), Panlobular Emphysema 29 (14.50%) and Both two type

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was found in 7 cases (3.50%). All cases diagnosed by Clinical examination and Confirmed by Radiological examination. Similar result found in the study conducted by Adwani S et al (2020)[14]

Table No. 4: Distribution of cases according to associated Comorbidity (N=200). Majority of cases associated with HTN 61 (30.50%) followed by Asthma 47 (23.50%), 28 cases found no associated comorbidity, 27 cases had a history of DM, Anxiety found in 12 (6%) and Rhinitis found in 17 (8.50%).Similar result reported by Viegi G et al (2007)[15]

Table no.5: Association of cases with age. There is statistically highly significant association between age and Chronic Bronchitis. Similar result observed in the study conducted by Al Ghobain M et al (2015)[12].Another study reported similar result Ntritsos G et al (2018)[13]

Table no. 6: Association of Emphysema cases with gender. There is statistically significant association between Emphysema with gender. Similar result found in the study by Sinha B et al (2017)[15] Another study reported Similar result by Al Ghobain M et al (2015)[12]

## Conclusions

majority of study participants belongs to the age group of 51-60 years

High prevalence of COPD was found in males. Majority of cases found with Chronic Bronchitis. There is statistically highly significant association between age and Chronic Bronchitis. There is statistically significant association between Emphysema with gender

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