Original Research Paper

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Pulmonary Medicine

APPLYING THE NEW GOLD TAXONOMY FOR OLD COPD CASES AND ITS IMPLICATIONS

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ABSTRACT **INTRODUCTION:** The estimated global prevalence of COPD is 11.37% and in India, it is 7.4%. More than 90% of COPD-related deaths occur in low- and middle-income countries (LMICs) (1). Risk factors of COPD in non-smokers include genetic factors, long-standing asthma, outdoor air pollution, environmental smoke exposure (ETS), biomass smoke, occupational exposure, recurrent respiratory infection in early childhood and tuberculosis. The GOLD 2023 update was a landmark for diagnosing, classifying and treating COPD patients, with the addition of taxonomy as a major change. **AIMS AND OBJECTIVES:** To retrospectively apply the new proposed taxonomy to classify old COPD patients, to estimate the percentage distribution in the population visiting my tertiary care hospital and to increase the awareness of non-smoking COPD and to call for future studies and attention to this sub-group. **MATERIALS AND METHODS:** Spirometry records of all patients visiting our OPD from February 2022 to December 2022 were studied and the spirometry criteria to diagnose COPD was applied. The data was tabulated on Microsoft Excel and the past history of infections, related radiographical evidence from another in-house PACS was taken and the cigarette/tobacco/chulha smoke exposure history was recorded as per information fed into the Spirometry software. Then patients were classified and pictorial representation was done **RESULTS:** Prevalence of COPD-P was the maximum followed by COPD-C followed by COPD-I and then COPD-A. No patients of COPD-G, D were found. We were able to classify all patients into some category, so there were no patients with an unknown cause (COPD-U). There was a greater proportion of non-smoking COPD in females and more proportion of smoking COPD in males. Greater proportion of patients in moderate, severe and very severe category were found to be due to non-smoking COPD. **CONCLUSIONS:** My analysis was congruent with the Indian data showing more prevalence of non-smoking COPD and hence, certain feasible low-cost interventions are required to decrease this exposure. Regular Spirometry monitoring is required for cured Pulmonary Tuberculosis patients to detect COPD-I in its early stage

KEYWORDS : Spirometry, Non-smokers, Taxonomy.

INTRODUCTION

COPD= Post Bronchodilator (BD) FEV1/FVC ratio < 0.7 with Post BD reversibility in best FEV1 value <200ml and 12%, diagnosed by Spirometry Young COPD= COPD developing between 20-50years of age Pre-COPD= Symptomatic individuals with significant risk factor exposure with radiologic structural abnormalities like emphysema and/or air trapping along with low FEV1 at the outset or rapid decline of FEV1 on subsequent visits without FEV1/FVC ratio being <0.7 PRiSM= Pre and PostBD FEV1/FVC ratio >0.7 but Post BD FEV1 and/or FVC <80% predicted. 7-20% prevalence. 40-50% of these PRiSM patients develop COPD in the next 5 years.

HYPOTHESIS: India differs greatly from the developed countries of the world in terms of percentage distribution of risk factors leading to COPD. My study will be to objectively evaluate my hypothesis and to encourage further research in the grey areas lacking data, regarding the prevalence of COPD patients according to the newly proposed classification system

RATIONALE: -

1. GETomics concept in GOLD 2023(2). Future research should aim to understand the effects of dynamic interactions between genes (G) and the environment (E) by integrating information from basic omics (eg, genomics, epigenomics, proteomics) and clinical omics (eg, phenomics, physiomics, radiomics) with exposures (the exposome) over time(T)

2. Adeloye D, Chua S et all(3)in 2010 concluded that based on 123 spirometry based studies from 37642 publications, the estimated COPD prevalence was least(9.7%) in SE Asian countries as compared to USA which had 15.7%. This could be due to lack of studies and under-reporting and under-diagnosing in SEAsian countries,

3. Salvi SS and Barnes J(4) suggested that non-smoking COPD was more prevalent than smoking COPD in India

Aim: To retrospectively identify spirometry defined COPD patients and classify them into different etiological taxonomy as suggested by the latest GOLD 2023 update

Objectives: To quantify the past patients who had visited our tertiary care center and compare the percentage distribution of their etiologies and to provide feasible solutions to our analysis.

METHODOLOGY

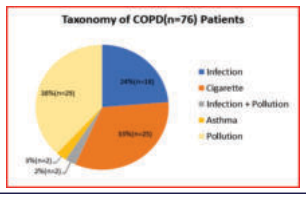
Place of study= OPD and IPD of Smt. Kashibai Navle Medical College and General Hospital, Pune

- Spirometry tests of 800 patients visiting our OPD and IPD were analyzed and 84 patients were selected from February 2022 to December 2022, according to Spirometry criteria to diagnose COPD
- Risk factor exposure history was recorded from the information fed into the Spirometry machine before performing.
- Radiological evidence for past history of Pulmonary Tuberculosis/Pneumonia was obtained by searching for them on our institute's PACS
- Data was tabulated on Microsoft Excel and total 84 patient entries were made and information under different headings was recorded
- Different filters were applied for diagnosis and taxonomy to come up with numbers for each, which were then converted into pie charts for pictorial representation

Inclusion criteria= Spirometry defined COPD patients having PostBD FEV1/FVC ratio <0.7 with a FEV1 reversibility <200cc and 12% Patients having minimum 2hours of indoor biomass fuel (chulha smoke) exposure daily x 11years, which was found equivalent to 10pack years of tobacco smoking as per Salvi SS et all.

Exclusion criteria= PRiSM, asthma, restrictive pattern on Spirometry Ethical clearance was not required since it was a retrospective observational study without any identity revelation

RESULTS



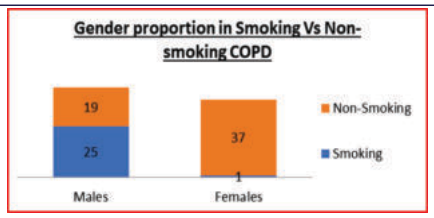


FIGURE-2

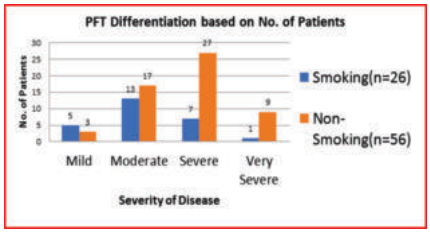


FIGURE-3

- There were no patients under COPD-D and COPD-G
- No patients came under COPD-U. However, 2.6%(n=2) patients were found to be of I+P so more research is required to classify such patients under a single heading
- Non-smoking COPD (n=56) had predominant females (n=37)
- Smoking COPD (n=26) had predominant males (n=25)
- In severe and very severe category, more patients were non-smoking COPD than smoking COPD, suggesting that more regular PFTs and CAT score progress should be done post recovery from Infection to prevent them from deteriorating

DISCUSSION

- In HICs, tobacco smoking- leading risk factor. In LMICs- tobacco smoking= only in 30-40% of cases(1). LMICs constitute 85% of global COPD burden so non-smoking COPD globally constitutes >50% cases(1). Our data was congruent with this since it showed 68% being non-smoking COPD and 32% being smoking COPD.

- Mahmood T, Singh RK et all published in Lung India 2022(5) that out of 200 COPD patients, the proportion of nonsmoker patients was 56.5%, and the smoker was 43.5%. Among 113 nonsmoker COPD patients, most important and statistically significant risk factor was exposure to biomass smoke (53.98%) > treated pulmonary tuberculosis (32.74%) >> long-standing asthma (14.16%). My analysis was found to be congruent with this data

- Yang IA, Jenkins et all (2022)(1) postulated that wood, animal dung, crop residue and coal burned in open fires or poorly functioning stoves caused high level pollution.
- Because biomass fuel still continues to be used in ~ 50% of homes worldwide, it is estimated that 3 billion people are exposed to indoor smoke from the burning of biomass fuel and are at risk for its adverse respiratory effects. Women, young girls, and small children are exposed for the longest duration because they spend more time in proximity to the biomass smoke. In developing countries, girls start cooking at the age 15 years and spend an average of 4 to 6hours daily in the kitchen

- Potential mechanisms for the pathogenesis of COPD in never-smokers include inflammation, oxidative stress, airway remodelling, and accelerated lung ageing. Further research-including epidemiological, translational, clinical, and implementation studies-is needed to address gaps in understanding and to advance potential solutions to reduce the burden of COPD in never-smokers.

CONCLUSION AND APPLICATION

Feasible, low-cost measures-
1. Cooking outdoors (if possible)
2. Keeping children, especially infants, away from cooking areas as much as possible
3. Improving ventilation by adding more windows/building chimneys/exhaust fans above stoves
4. Use biogas as clean fuel

- Yumin Zhou et all (2014)(6) did a 9 year prospective cohort study and they postulated that interventions were implemented starting in 2002 to improve kitchen ventilation. They found that the decline in FEV_1 was reduced by 12 ml/y (95% CI, 4 to 20 ml/y) and 13 ml/y (95% CI, 4 to 23 ml/y) in those who used clean fuels and improved ventilation, respectively, compared to those who took up neither intervention.

- Romieu, Rodriguez et all in 2009(7), Mexico proved that use of the Patsari stove was significantly associated with a reduction of symptoms and of lung function decline comparable to smoking cessation. Actual use of the Patsari stove was associated with a lower FEV(1) decline (31 ml) compared with the open fire use (62 ml) over 1 year of follow-up (P = 0.012) for women 20 years of age and older, adjusting for confounders

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