

To study the prevalence and risk factors in patients of chronic obstructive pulmonary disease (COPD)

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I. Introduction

Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory lung disease that causes obstructed airflow from the lungs caused by long term exposure to irritants like smoking etc. Emphysema and chronic bronchitis are the two most common conditions that contribute to COPD⁽¹⁾. Symptoms begin with intermittent coughing and shortness of breath. In the later stage, fatigue, weight loss and pedal edema may occur.

Now a days, COPD is well-established term for obstructive lung function impairment and has become the third most common cause of death year 2020. Burden of COPD is great for both for those directly affected and for society. The majority of the COPD patients dependent on home oxygen treatment are former smokers and resembles just the top of an iceberg, since predominantly advanced cases of COPD get hospital care^(1,2).

Several epidemiological studies have addressed the prevalence of COPD in India, the limiting issue in these being the methodology adopted and the definitions employed for diagnosis. Most of the studies have been unvalidated questionnaire based, supplemented on occasion by measurement of peak flows⁽³⁾.

When evaluating age as a risk factor for COPD, an important issue is also the spirometric criteria of COPD. A fixed ratio for the definition of airway obstruction (FEV_1/FVC or $VC < 0.70$) will overestimate COPD in elderly and underestimate COPD among young adults⁽⁴⁾. Smoking affects not only the smokers but also non-smoker. Environmental tobacco smoke, ETS, or passive smoking, is associated to an increased risk of respiratory symptoms^(5,6,7), chronic bronchitis⁽⁸⁾ and obstructive respiratory disease⁽⁹⁾.

II. Aims And Objectives

- To study the prevalence of COPD in the middle-age and elder age group.
- To examine the impact of smoking on COPD and its other determinants.

III. Materials And Methods

All the patients visiting the outpatient department of pulmonary medicine were screened for COPD at a tertiary care hospital. The patients who fulfilled the inclusion criteria were enrolled in this study. The consent and thorough history of patient was taken and noted. Age, smoking habits, gender, occupation and family history of obstructive lung disease were used as determinants of this disease.

Family history of obstructive lung disease (OLD) was considered present if at least one of the questions of family history of asthma, chronic bronchitis or emphysema was answered in the affirmative.

The spirometric criteria of the following guidelines were used:

BTS (British Thoracic Society) = $FEV_1/VC < 0.70$ and $FEV_1 < 80\%$ predicted

GOLD (Global Initiative for Chronic Obstructive Lung Disease) = $FEV_1/FVC < 0.70$

“Clinical ATS” $FEV_1/FVC < 0.75$ and chronic productive cough (chronic bronchitis) or reported physician-diagnosis of chronic bronchitis or emphysema

“Spirometric ATS” $FEV_1/FVC < 0.75$

Inclusion criteria:

- Asymptomatic adults of age 40 and over with screen detected fixed airway obstruction.
- Current smokers.
- Patients with mild ($FEV_1 \geq 80\%$ normal) and moderate ($FEV_1 = 50-70\%$ normal) COPD.

Exclusion criteria:

- Patients with identified alpha-1 antitrypsin deficiency.
- Unwilling patients.
- Pregnant and lactating women.
- Patients with moderate ($FEV_1 = 30-49\%$ normal) and ($FEV_1 \leq 30\%$ normal) severe COPD.

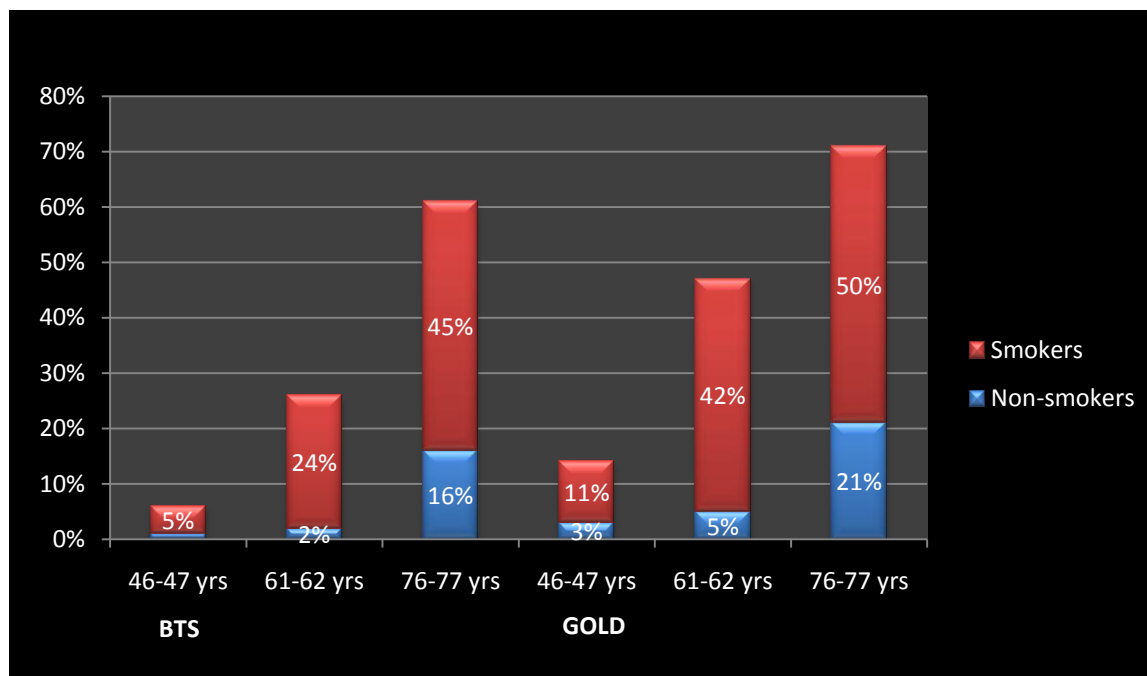
IV. Observation And Results

The patients with COPD satisfying the inclusion criteria were enrolled in this study. The consent was taken and then examined. The following results were made:

Prevalence of COPD:

The prevalence was associated with higher age and smoking but not gender, similar to the first sample. The prevalence was 8.1% and 14.3% according to the BTS and GOLD criteria, respectively. The prevalence according to the GOLD criteria based on pre-bronchodilator spirometry values was higher, 17.2%, similar to the 17.1% in ages ≥ 45 years in the random sample. The prevalence of COPD according to the BTS criteria by age strata was 2.8% (46-47 years), 9.0% (61-62 years) and 19.7% (76-77 years), corresponding figures in non-smokers were 1%, 2%, and 16%, while in smokers 5%, 24% and 45 %, respectively. The prevalence of COPD according to the GOLD criteria were 3%, 5% and 21% in non-smokers, while in smokers it was 11%, 42% and 50%. The prevalence of COPD by age group and gender are summarised in Figure 1.

Figure 1. Prevalence of COPD according to the BTS and GOLD spirometric criteria, by age group and gender.



Risk factors and the population attributable fraction of smoking:

In multiple logistic regression models the major risk factors for COPD were higher age and smoking. Family history of OLD was also a significant or close to significant risk factor for COPD, while gender was not. In the age stratified sample, the adjusted Odd's ratio for COPD, according to the GOLD and BTS criteria in subjects age 61-62 years, were 3.78 and 4.96, and in those aged 76-77 11.4 and 18.3 compared to the youngest subjects aged 46-47 years. Smoking >15 cigarettes/day yielded an adjusted OR of 8.04 and 8.77, respectively, when compared to non-smokers. The socio-economic class manual worker in industry was a significant risk factor for COPD according to GOLD. The Odd's ratio were most often higher when the BTS criteria for COPD were used in the analyses compared to the GOLD criteria.

The population attributable fraction (PAF) for ever smoking in COPD according to GOLD was 58% (BTS 47%) in subjects aged 46-47 years, 65% (BTS 76%) in subjects aged 61-62 years, and 22% (BTS 21%) in subjects aged 76-77 years. The PAF for ever smoking in COPD (BTS) was 41%, while in men 64%, and in women 29% (GOLD 43%, 46% and 37%). Of all subjects fulfilling the GOLD criteria for COPD 23% reported that they never had been smokers (BTS 24%) and the relative proportion of non-smoking cases with COPD increased with increasing age and were more common among women.

V. Discussion

The population attributable fraction (or proportion), PAF, is a measure of the public health impact of a certain exposure, while it is a function of the potential harm of the exposure (through the relative risk) and how common the exposure is (through its prevalence, in our analysis proportion of ever smokers). The results indicate that factors other than smoking are of increasing importance for COPD among elderly.

The prevalence of COPD according to the BTS criteria, similar to a study done by Jansson et. Al⁽⁶⁾, yielded a prevalence of 4.1% in ages <45 years and 9.7% in ages \geq 45 years in the general population sample, and 8.1% in the age-stratified general population sample in which all were >45 years. In the age-stratified sample the prevalence was low in ages 46-47 years; 1.8% in men and 3.7% in women (totally 2.8%). The prevalence increased markedly by age, especially in men. The prevalence in age 61-62 years was increased by four times, and in age 77-78 years it was increased by twelve times in men. In women, the prevalence was increased by almost three and almost five times in respectively age group.

Developing countries are changing fast. Socio-economic development, industrialization, urbanization, changing age structure, and changing lifestyles have the countries at a position where they are facing an ever increasing burden of non-communicable diseases (NCD)⁽¹⁰⁾ In India NCDs were estimated to have accounted for 53% of all deaths and 44% of disability-adjusted life-years (DALY's) lost. Of these chronic respiratory disease accounted for 7% deaths and 3% DALY's lost⁽¹¹⁾. Smoking is by far recognized to be the most important risk factor for development of COPD. Smoking behaviors in India are also peculiar with a large number of people using non conventional form of tobacco in hookah, bidi, or chillum. Traditionally these forms of tobacco have been believed to be innocuous because of a variety of reasons like passage of smoke through water in case of hookah. Recent studies have, however, dispelled these misperceptions.^[12,13] Lung cancer has been found to be nearly 6-times common in hookah smokers compared to non-smokers,^[12] and Chillum smoking has been demonstrated to result in much higher increase in end tidal carbon monoxide levels than cigarette smoking,^[13] testifying to its injurious potential.

VI. Conclusion

The prevalence of COPD in an age-stratified sample of middle-aged and elderly >45 years was 8.1% according to the BTS criteria and 14.3% according to GOLD and increased markedly with increasing age from 2.8% in ages 46-47 years to 19.7 % in ages 76-77 years with no significant gender difference (BTS criteria). Among smokers the prevalence of COPD according to the BTS criteria was 5% in the ages 46-47 years, 24% in the ages 61-62 years and 45% the in ages 76-77 years while in non-smokers it was 1%, 2% and 16%, respectively. Corresponding figures on prevalence of COPD according to the GOLD criteria were 11%, 42% and 50% in smokers, while 2%, 5% and 21% in non-smokers. The risk (OR) for COPD according to the BTS criteria was nine times higher in smokers than in non-smokers when adjusted for confounders including age. Besides smoking and age, no risk factors yielded OR above 2. An increased risk for COPD was found for family history of OLD and manual work in industry. The incidence was significantly associated with increasing age and smoking but not gender. However, gender-specific multivariate analyses adjusting for confounders revealed smoking to be a significant risk factor in women and close to in men, while age was a significant risk factor in men only.

There are limited data on the course of COPD, or "the natural history of COPD". This is especially true among elderly. There are basically very limited data on the development of lung function among elderly in the general population. Also the use of current spirometric criteria of COPD in elderly has to be further evaluated. In an ageing population it is very important to increase the knowledge and evaluate the impact of a disease known to be associated with age, as COPD.

CONFLICT OF INTEREST: Nil

Reference

- [1]. Lopez AD, Shibuya K, Rao C, Mathers CD, Hansell AL, Held LS, et al. Chronic obstructive airway disease: Current burden and future projections. *Eur Resp J* 2006;27:397-412.
- [2]. Salvi S, Agarwal A. India needs a national COPD prevention and Control program. *J Assoc Physicians India* 2012;60 Suppl: 5-7.
- [3]. Jindal SK, Aggarwal AN, Gupta D. A review of the population studies from India to estimate national burden of chronic obstructive pulmonary disease and its association with smoking. *Indian J Chest Dis Allied Sci* 2001;43:139-47.
- [4]. Hardie JA, Buist AS, Vollmer WM, Ellingsen I, Bakke PS, Morkve O. Risk of over-diagnosis of COPD in asymptomatic elderly never-smokers. *Eur Respir J* 2002; 20(5):1117-1122
- [5]. Robbins AS, Abbey DE, Lebowitz MB. Passive smoking and chronic respiratory disease symptoms in non-smoking adults. *Int J Epidemiol.* 1993; 22(5):809-817
- [6]. Jansson SA, Andersson F, Borg F, Ericsson A, Jonsson E, Lundäck B. Cost of COPD in Sweden according to disease severity. *Chest* 2002; 122:1994-2002
- [7]. Larsson, Lars. Incidence and Prevalence of Asthma - Relation to differences in utilisation of asthma drugs between two neighbouring Swedish Provinces. Umeå University Medical Dissertations, 1995; New Series No 427, ISBN 91-7174-996-9, ISSN 0346-6612
- [8]. Radon K, Busching K, Heinrich J, Wichman H-E, Jörres RA, Magnussen H, Nowak D. Passive smoking exposure. A risk factor for chronic bronchitis and asthma in adults? *Chest* 2002; 122:1086-1090
- [10]. Dayal HH, Khuder S, Sharrar R, Trieff N. Passive smoking in obstructive respiratory disease in an industrialized urban population. *Environ Res* 1994; 65(2):161-171.
- [11]. Mahal A, Karan A, Engelgau M. The economic implications of non-communicable disease for India. Washington DC: The International Bank for Reconstruction and Development/The World Bank; 2009. p. xiv.
- [12]. ICMR-MRC Workshop. Building Indo-UK Collaboration in chronic diseases; 2009. p. 16.
- [13]. Koul PA, Hajni MR, Sheikh MA, Khan UH, Shah A, Khan Y, et al. Hookah smoking and lung cancer in the Kashmir valley of the Indian subcontinent. *Asian Pac J Cancer Prev* 2011;12:519-24
- [14]. Singh S, Soumya M, Saini A, Mittal V, Singh UV, Singh V. Breath carbon monoxide levels in different forms of smoking. *Indian J Chest Dis Allied Sci* 2011;53:25-8.

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