ORIGINAL RESEARCH PAPER

Pulmonary Medicine

A CROSS SECTIONAL STUDY OF NICOTINE DEPENDENCE AND ITS DETERMINANTS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE AT INSTITUTE OF RESPIRATORY DISEASES, SAWAI MAN SINGH MEDICAL COLLEGE, JAIPUR, RAJASTHAN.

KEY WORDS: Smoking Cessation, Chronic Obstructive Pulmonary Disease, Nicotine Dependence

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ABSTRACT

Background: Smoking cessation is the most powerful intervention to modify progression of chronic obstructive pulmonary disease (COPD), and nicotine dependence is one of the most important determinants of success or failure in smoking cessation. Thus, nicotine dependence status and factors associated with moderate to high nicotine Dependence in patients with COPD needs to be evaluated.

Method: A hospital based cross-sectional observational study performed on 50 patients with COPD attending the outpatient department at smoking cessation clinic, Institute of Respiratory Diseases, SMS Medical College, Jaipur, Rajasthan during 2019-2020.

Result: Multiple logistic regression analysis revealed that low education status, age 60 yrs., and mild to moderate airflow obstruction were related to moderate to high nicotine dependence.

Conclusion: Nicotine dependence does not correlate with smoking amount, but with education level, age, and severity of airflow obstruction. Physicians should provide different strategies of smoking cessation intervention for current smokers with COPD according to their education levels, age, and severity of airflow obstruction.

INTRODUCTION

COPD is common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases (GOLD 2019).[1] It is a progressive and distressing condition which is a leading cause of death and disability globally.[2] Major presenting symptoms are chronic cough, difficulty in breathing and sputum production.[3] Chronic inflammation results in small airway disease and parenchymal destruction which contributes to the airflow restriction and mucociliary dysfunction.[4]

Cigarette smoking is the most important risk factor for development and progression of COPD.[5] Smokers with respiratory diseases have peculiarities that can impede smoking cessation, such as a higher level of nicotine dependence; nicotine withdrawal; higher levels of exhaled carbon monoxide; low motivation and low self-efficacy and a high prevalence of anxiety and depression.

As the amount of cigarette smoke increases, respiratory symptoms become more pronounced and lung function deteriorates.[5] Therefore, smoking cessation is crucial to prevent the progression of COPD[6-7] and reduces risk of many comorbid conditions such as cardiovascular diseases and lung cancer.[8] It has been known that current smokers with COPD have higher nicotine dependence than current smokers without COPD.[9-10] However, there were few studies on predictors of moderate to high nicotine dependence in current smokers with COPD.[11-12]

MATERIALS AND METHODS

A hospital based cross-sectional observational study performed on 50 patients with COPD attending the outpatient department at smoking cessation clinic, Institute of Respiratory Diseases, SMS Medical College, Jaipur, Rajasthan during 2019-2020.Patients were selected after applying following criteria:

Inclusion Criteria:

1. Patients with diagnosis of COPD according to GOLD 2019 guidelines
2. Age ≥40 years
3. Current smokers

Exclusion Criteria:

1. Patients with acute exacerbation of COPD
2. Patient with past or present h/o ATT
3. Fibrocavitatory lung disease on chest x-ray
4. Patients with other obstructive airway disease than COPD
5. Patients not giving consent

At the time of inclusion, a standard questionnaire was used to obtain information on smoking history, level of education, and comorbidities. COPD assessment test (CAT) was used for evaluation of COPD impact on health status. The level of dyspnea was assessed by modified Medical Research Council (mMRC) grade. Spirometry with reversibility was performed. Fagerstrom test for nicotine dependence (FTND)[13] was done. The FTND generates a score based on the sum of the six questionnaire items, which are variably weighted. FTND yields a total score from 0 to 10 points (mild, 0 to 3; moderate, 4 to 6; severe, 7 to 10). Subjects with a score of 4 or higher were defined as having moderate to high nicotine dependence.

Statistical Analysis

Significance was evaluated by chi-square test for categorical variables and Mann Whitney U test for continuous variables and p-value of <0.05 was regarded as statistically significant. Multiple logistic regression analysis was used to investigate factors associated with moderate to high nicotine dependence.

RESULTS

Out of 50 patient 45 (90%) were male and the median age was 60.5 years. Clinical characteristics of patients are detailed in Table 1 & 2. Multiple logistic regression analysis revealed that

low education status (odds ratio, 1.3715; 95% confidence interval, 1.0315–1.8359; p=0.0299), age 60yrs (odds ratio, 0.8713; 95% confidence interval, 0.7707–0.9851; p=0.0278), and mild to moderate airflow obstruction (odds ratio, 0.8854; 95% confidence interval, 0.7927–0.9889; p=0.031) were related to moderate to high nicotine dependence.

Table: -1 Clinical characteristic of current Smokers with COPD

VARIABLES	VALUE(N=50)
Male sex	45(90)
Age (years)	60.5(53-65)
BMI (kg/m^2)	20.53(18012-23.65)
Comorbid disease	
Diabetes Mellites	4(8)
Hypertension	13(26)
CAD	2(4)
mMRC	1(1-2)
CAT	8(7-9.75)
Spirometry	
FEV1(%predicted)	58.5(54-67.5)
FEV/FVC %	52(50-64)
Smoking(pack/year)	30(24-40)
FTND Score	5(3.25-7)
FTND≥4	37(74)
Education (Years)	0(0-5)
Ex CO Level	7.5(4.25-10)
Economic Status	5000(0-10000)
Location, Urban	25(50)
*Values are presented as number (%) or median (interquartile range).	

Table: -2 Factors related to moderate to high nicotine dependence of current smokers with COPD

VARIABLES	Low Nicotine Dependence (N=13)	Moderate to High Nicotine Dependence (N=37)	p- Value	Chi-square Statistics	Mann-Whitney U Test Value
Male sex	11(84.61)	34(91.89)	0.451873	0.566	
Age (years)	65(62-66)	60(50-64)	0.02574		139
BMI (kg/m^2)	20(18.9-21.56)	20.8(17.3 24.2)	0.5552		213.5
Comorbid disease					
Diabetes Mellites	1(7.69)	3(8.1)	0.962085	0.00023	
Hypertension	3(23.07)	10(27.02)	0.78003	0.078	
CAD	1 (7.69)	1(2.7)	0.429675	0.6273	
mMRC	1(1-1)	1(1-2)	0.34722		197.5
CAT	8(7-9)	8(7-10)	0.82588		230
Spirometry					
FEV1 (%predicted)	68(58-72)	58(52-62)	0.0455		149.5
FEV1/FVC %	62(52-66)	50(52-58)	0.1031		166.5
Smoking (pack/year)	25(24-30)	30(25-40)	0.09894		165.5
Education (Years)	5(0-5)	0(0-0)	0.04036		147.5
Ex CO levels	6(3-8)	8(5-12)	0.03846		146.5
Economic Status	5000(0-6000)	6000(4000-10000)	0.4654		207
Location, Urban	6(46.15)	19(51.35)	0.74714	0.104	
*Moderate to high nicotine dependence is FTND≥4 Values are presented as number (%) or median (interquartile range).					

DISCUSSION

Our study showed that the maximum number of patients 17 (34%) were seen in 60-70 years of age group. Factors related to moderate to high nicotine dependence were seen in relatively younger patients (60 years vs. 65 years, p=0.025). A previous study[14] showed mean age of COPD patients with high nicotine dependence was 57.9±7.5 years and that with low nicotine dependence was 60.0±8.0 years.

In our study overall 52% of patients were illiterate and 30% of patients were of primary school level in education. Moderate to high nicotine dependence were relatively seen in low education status (0 years vs. 5 years, p=0.040). Low education status in our study was consistent with previous studies (by Pack HJ, Jamal M & Pennanen M et al)[16-17] which showed that lower education level was linked with higher nicotine dependence among current smokers. On the contrary, a study done by Osme SF et al[18] found that high education status was the most significant factor related to nicotine dependence in current smokers with COPD. They reported that nicotine dependence in smokers who had ≥8 years of formal education was 2.57 times higher than that in those with less education.

Even though the relationship between education levels and nicotine dependence needs to be investigated further, our study indicates that physicians should provide different strategies of smoking cessation intervention for current smokers with COPD according to their education levels.

Our study showed that majority of patients (80%) were of low economic status. There is evidence that the risk of developing COPD is inversely related to socioeconomic status.[19] It is not clear, however, whether this pattern reflects exposures to indoor and outdoor air pollutants, crowding, poor nutrition, or other factors that are related to low socioeconomic status.[20]

In our study, maximum patients (46%) had 25-50 pack years of smoking followed by 38% of patients who had 0-25 pack years of smoking. The median smoking amount was 30 pack years. However, there was no differences in pack-years of cigarette smoking between two groups according to nicotine dependence. Yun Su Simet al[21] found that the median smoking amount was 44 pack-years, which was not related to nicotine dependence, which was consistent with our results. In a study of Lindberg et al[22] of COPD patients, median smoking amount was 23.8 pack years which showed lower median smoking amount with those of our study. On the contrary study done by Kim DK[23] on genetics of nicotine dependence in COPD, mean smoking amount was 51.7 pack years, which was higher than those of our study.

Our study showed that 26% of patients had hypertension, 8% of patients had diabetes mellitus and only 4% of patients had CAD comorbidity in COPD patients. Patients suffering with COPD and other comorbidities associated with other pathologies has high impact on healthcare services; as a consequence, COPD patient stratification should regard the comorbidity burden in addition to the degree of obstruction. In a study by de Miguel et al[24] focusing on family practices in Spain showed that prevalence of heart disease among COPD patients was 19%.

Our study showed that the median CAT score was 8, and median mMRC dyspnea scale was 1. The median FEV1/FVC was 52% and the median FEV1 was (58.5% predicted). The median FTND score was 5, and 37 patients (60%) had moderate to high nicotine dependence. However, there was no difference of mMRC grade and CAT score between two groups according to nicotine dependence.

CONCLUSION

Cigarette smoking is the most commonly encountered risk factor for COPD. It has led to the incorporation of smoking cessation program as a key element of COPD prevention, as well as an important intervention for patients who already have the disease. Smoking behavior has traditionally been

viewed as the manifestation of either a biological dependence to nicotine or a learned habituated routine. Age at starting of smoking, total pack years of smoking &current smoking status are predictive of COPD mortality.

Nicotine dependence developing in many smokers and smokers with dependency to nicotine tends to have increased smoking intensity. Thus, nicotine dependence may increase the impact of smoking exposure due to altering the frequency of depth of smoke inhalation, even in COPD patients with the same pack year history.

To conclude, in order to provide effective smoking cessation, intervention for current smokers with COPD, treating physician need to consider the level of individual education, age & severity of airflow obstruction.

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