

# FREQUENCY OF COMMON RISK FACTORS IN PATIENTS WITH STABLE CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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## ABSTRACT

**Objective:** To determine the frequency of common risk factors in stable COPD patients presented to outpatient department of Pulmonology unit Khyber Teaching Hospital Peshawar.

**Methodology:** This descriptive cross sectional study was conducted at Pulmonology unit, Khyber Teaching Hospital from July 2010 to July 2011 (One Year). Data was collected by Convenience sampling (non probability). A total of 196 patients with stable COPD were included in the study. Demographic data and common risk factors like gender, smoking status, indoor air pollution exposure, occupational exposure and family history, were recorded and analyzed through an objective oriented proforma.

**Results:** Out of 196 patients 80% were males and 20% were females. Mean age was 55.28 ( $\pm 8.91$ SD) years. Among them 137 (70%) were smokers and 59(30%) were non-smokers. Among the smokers 36% were current smokers, 24% were ex-smokers and 10% were passive smokers, while 14% of the non-smokers were exposed to indoor air pollution, 13% were affected by occupational exposure and 3% were having positive family history.

**Conclusion:** Cigarette smoking, indoor air pollution and occupational exposure were the common risk factors for the development of COPD where cigarette smoking being the commonest.

**KEY WORDS:** COPD; Smokers; Risk Factors; Indoor Pollution

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## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a slowly progressive disorder characterized by fixed or partially reversible airflow obstruction (FEV<sub>1</sub><80% predicted and FEV<sub>1</sub>/FVC <70%).<sup>1</sup> The prevalence of COPD is about 9-10% in adult over the age of 40 years worldwide.<sup>2</sup> In Pakistan almost the same prevalence was found in urban areas while it was 14% and 6 % in rural females and males respectively.<sup>3</sup>

It is estimated to be the fifth common cause of chronic disability worldwide by 2020 and is on rise and will be the third leading cause of death worldwide by 2020.<sup>3,4</sup>

Cigarette smoking is the most important risk factor and other important factors are infections, exposure

to occupational pollutants, indoor and outdoor pollution and burning biomass fuel.<sup>5,6</sup> Genetic factors also predispose to development of COPD.<sup>4</sup>

Although tobacco smoking is the well known risk factor for COPD, nonsmokers also develop the disease due to other risk factors especially in developing countries. About 25-45% patients with COPD have never smoked, therefore the burden of non-smoking COPD is much higher than previously believed.<sup>7</sup> Data suggests that up to 50% of COPD patients are tobacco smokers while 20% of COPD cases are exposed to indoor smoke.<sup>4</sup> There is an association between risk of COPD and passive smoking at home and work place with associated increase in the disease prevalence.<sup>8</sup> Indoor air pollution caused by indoor burning of animal dung, wood, coal and crop

residues in open fires or poorly functioning stove result in between 2.7 and 2.8 million deaths annually and is an important public health concern in developing countries.<sup>9</sup> Outdoor air pollution is also associated with developing COPD.<sup>10</sup> About 15% of the cases of COPD are work related and people with certain occupation such as coal and hard rock miners, tunnel, concrete manufacturing and non mining industrial workers have increased risk of developing COPD. Certain data suggest the role of genetics (  $\alpha_1$ -antitrypsin deficiency), which are being investigated.<sup>4,11</sup>

COPD, being a common health problem, is an understudied disease in Pakistan. Especially females as COPD victims need special attention as they are more exposed to biomass fuel and indoor pollution.

Therefore present study was designed to determine the frequency of common risk factors in patients presented with stable COPD because addressing these factors properly and effectively at domestic level may helps in prevention of the disease and its complications.

**METHODOLOGY**

This descriptive cross sectional study was conducted at Pulmonology unit, Khyber Teaching Hospital from July 2010 to July 2011 (One Year). Data was collected by Convenience sampling (non probability. Sample size was calculated to be 196 using 15%<sup>11</sup> proportion of occupational risk of COPD, 95% confidence level and 5% margin of error, under WHO software for sample size determination. All adult patients having stable COPD according to GOLD guidelines,<sup>12</sup> presenting to outpatient department of Pulmonology unit, Khyber Teaching Hospital, Peshawar were included. COPD was diagnosed according to GOLD criteria using spirometry i.e. (FEV1<80% predicated and FEV1/FVC<70%). Stable COPD was defined on the basis of spirometry, as any stage of COPD but without symptoms of exacerbation.<sup>1</sup> Smokers were defined as those who have smoked at least 100 cigarettes during their lifetime. Smoking was measured in terms of pack years of smoking which was calculated as (number of cigarettes smoked per day x number of years smoked)/20 (1 pack has 20 ciga-

rettes)

Passive smoking meant history of exposure to cigarette smoke in same work place or in a room at home for  $\geq 4$  hours per week for consecutive  $\geq 5$  years.

Indoor air pollution was labeled as if there was history of more than four hours exposure to smoke producing fire daily for consecutive  $\geq 5$  years.

Similarly Occupational exposure was present when patients gave history of exposure to dust at work place for  $\geq 6$  hours daily for  $\geq 5$  consecutive years.

Patients with asthma as shown by increase in FEV1 of >15% (>200ml) 15 min after inhalation of standard dose of beta-2 against were excluded. Also patients with Left ventricular failure, Pneumothorax, Bronchiectasis, Lung abcess, post tuberculous fibrosis were excluded.

Approval of the ethical committee of Khyber Teaching Hospital, Peshawar was taken. Written informed consent was taken from all patients. Demographic characteristics were recorded and information regarding risk factors like smoking, indoor air pollution, exposure to occupational pollution and family history were obtained by taking history and checking the previous record. All the data was collected through objective oriented proforma.

Data was entered into SPSS 10.0 for statistical analysis. Descriptive statistics were used to describe and analyze the data. Mean and standard deviation was used for numerical variables and Frequency and percentage was used for categorical variables.

**RESULTS**

Among 196 patients there were 156 (80%) male and 40 (20%) females. Mean age was 55.28 years with standard deviation  $\pm 8.91$ . Distribution in to different age groups is shown in table no.1.

Occupations of the patients were analyzed as, 8 (4%) patients were businessmen, 6 (3%) patients were teachers, 6 (3%) patients were drivers, 112 (57%) patients were farmers, 10 (5%) patients were laborers,

Table No 1. Age group Distribution of patients (n=196)

Age	Frequency	Percentage
30 - 40 Years	08	04.08%
41 - 50 Years	55	28.06%
51 - 60 Years	66	33.67%
Above 60 Years	67	34.18%
Total	196	100%

Mean Age: 55.28 years  $\pm 8.91$  SD.

Table No 2. Risk Factors of COPD (n=196)

Smoking	Frequency	Percentage
Current Smokers	72	36%
Ex Smokers	46	24%
Passive Smokers	19	10%
Total	137	70%
Indoor Air Pollution	28	14%
Occupational Exposure	25	13%
Family History	06	3%
Total	196	100%

8 (4%) patients were shopkeepers and 46 (24%) patients were housewives.

Regarding Smoking status out of 196 patients 137 (70%) patients were smokers, and 59 (30%) patients were non smokers.

Among 137 (70%) patients who were smoking, 72 (36%) patients were current smokers, 46 (24%) patients were ex-smokers and 19 (10%) patients were passive smokers, besides this 28 (14%) patients were affected by indoor air pollution, 25 (13%) patients were affected by occupational exposure and 06 (3%) patients had positive family history (as shown in table 2) Those affected by indoor air pollution were all females.

Number of cigarettes smoked among 118 (60%) smokers (both current and ex-smokers) were analyzed as, 10 (8.47%) patients smoked 10-20 cigarettes per day followed by 24 (20.3%) patients smoked 20-30 cigarettes per day and 84 (71.18%) patients smoked more than 30 cigarettes per day. The mean number of cigarettes smoked was 31.3 with standard deviation ± 6.35.

Pack years history of smoking among 118 (60%) current and ex-smokers, were analyzed as, in 72 (36%) of the current smokers 11 (15%) patients had 7-10 packs years history followed by, 22 (30%) patients had 11-20 packs years history and 39 (55%) patients had >20 packs years history of smoking. While in 46 (24%) ex-smokers, 5 (10%) patients had 7-10 packs years history followed by 16 (36%) patients had 11-20 packs years history. Twenty five (54%) patients had >20 packs years history smoking as shown in table 3.

**DISCUSSION**

Chronic obstructive pulmonary disease (COPD) is a major cause of morbidity and mortality and represents a substantial economic and social burden through out the world. Though the study was conducted on a small sample, but sample size was fairly adequate to represent the overall pattern of accomplished risk factors of COPD.

A high prevalence of common risk factors was found in 196 patients studied with stable COPD. The most common were cigarette smoking, indoor air pollution and occupational exposure. The prevalence of family

Table No 3. Pack Years history in Current & Ex-smokers (n=118)

Smokers	7 - 10 pack years	11-20 pack years	>20 pack years	Total
Current smokers	11(15%)	22(30%)	39(55%)	72
Ex smokers	5(10%)	16(36%)	25(54%)	46
Total	16	38	64	118

history was low but still important to cause COPD.

In our study among 137 (70%) smokers, 36% patients were current smokers and 24% were ex-smokers consistent with 33% and 22% respectively in a study conducted by Siatkowaska,<sup>13</sup> while 10% were passive smokers with same findings reported by other study.<sup>14</sup> Smoking is considered by far the most important risk factor associated with functional decline in COPD.<sup>15</sup> Smoking cessation decreases the rate of faster decline in lung function, and exacerbations of COPD<sup>16,17</sup> and can prevent onset of disability and reduce the rate of functional decline and the risk of premature mortality.<sup>18,19</sup> It is currently being recommended for health professionals to ensure smoking cessation in all COPD patients to decrease its complications.<sup>1</sup>

Fourteen percent (14%) of patients of our study were affected by indoor air pollution and all of them were females, consistent with 12% and 13% reported by other studies conducted by Moreira et al and Kiraz et al respectively.<sup>20,21</sup> Indoor air pollution caused by smoke producing fire or poorly functioning stoves result in between 2.7 and 2.8 million deaths annually and is an important public health concern in developing countries,<sup>9</sup> whatever is the reason, it is a high percentage and needs to be addressed in COPD management and prevention.

Thirteen percent of our study population was affected by occupational exposure and similar result is shown by another study.<sup>22</sup> Exposure to different occupational pollutants is an important risk factor and leads to COPD independently of tobacco smoke<sup>23</sup> and thus need proper attention and preventive measures.

Three percent of our patients had positive family history and this finding is favoured by another study conducted by Rowinska.<sup>24</sup> Not all of the cigarette smokers develop COPD suggesting some other risk factors contributing to it most probably genetic,<sup>25</sup> thus it is important to give importance to family history and genetic risk factors while assessing COPD patients.

Majority of the current smokers and ex-smokers in our study had smoking history of more than >20 pack years with similar findings supported by another study conducted by Macron et al.<sup>26</sup> Risk of COPD increases with the amount smoked and pack years.<sup>27</sup>

Whereas early and aggressive attempt to stop smoking is the most appropriate measure for these persons to save their lung functions, addressing the common risk factors of COPD, early diagnostic facilities and targeted warning about the dangers of smoking, may be more effective than general smoking cessation advice. Effective smoking cessation needs

to be ensured from the very first encounter with COPD patient. Keeping in mind the impact on health and health care resources, it is essential to develop effective strategies for prevention of COPD by addressing these common risk factors.

Thus by recognizing the common risk factors and making earlier diagnosis may help reduce the burden of COPD through appropriate pharmacotherapy, prevention of exacerbations and pulmonary rehabilitation.<sup>28</sup>

In summary all studies showed a moderate to high prevalence of common risk factors in patients with COPD. This emphasizes the need for addressing these factors in management of COPD and its prevention.

There were many limitations of this study. First this was a small and one centered study so the results may not be generalized to other centers of Pakistan. Secondly most of the study variables were based on patient's available record and verbal responses and the possibility of recall bias was there. This recall bias might have affected the results of the study. Thirdly we could not evaluate the patients for other risk important factors such as hukka, cigar and shisha etc due to problem of quantification and low education level of patients. However there was adequate evidence that regarding risk factors COPD patients are not addressed and managed properly and there is definite need for health education in patients who are diagnosed as COPD, regarding the common risk factors of the disease.

## CONCLUSION

It has been found that cigarette smoking, indoor air pollution and occupational exposure were the common risk factors with cigarette smoking being the commonest, while the familial risk factor being the least common in patients with stable COPD in our setup. COPD is preventable if these risk factors are addressed properly and earlier such as smoking cessation the only measurement to improve survival in COPD patients.

Health care personnel should give priority to the recognition and prevention of these factors as well as education of the patients and those at risk, regarding all the aspects of these factors.

Based on the findings of the study it is suggested that large multicentre studies should be carried out at national level to further evaluate the risk factors responsible for development of COPD and further exacerbating it. Also evaluation for these common risk factors of COPD should be part of COPD management protocols.

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