EFFECT OF OCCUPATIONAL HAZARDS AND SMOKING ON THE COPD PROGRESSION

Valentina Petkova*, Miglena Doneva, Maria Kamusheva, Maria Dimitrova, Milen Dimitrov and Guenka Petrova

Faculty of Pharmacy, Medical University Sofia, Bulgaria.

SUMMARY
Chronic obstructive pulmonary disease (COPD) is a serious threat to healthcare systems worldwide. COPD is a major cause of disability and death among the population as a major etiological role in the disease has occupational hazards and smoking. The objective of this study was to study Bulgarian COPD patients in terms of their demographic characteristics and the effect of occupational hazards, smoking and the duration of time from diagnosis on disease progression. An observational study among patients diagnosed with chronic obstructive pulmonary disease of cities in Northwest, Northeast, Southwest, Southeast Bulgaria and Sofia was performed.

The study confirms that among the Bulgarian COPD patients the increased rate in GOLD is directly proportional to the hazard environmental factors and the smoking duration.

INTRODUCTION
Chronic Obstructive Pulmonary Disease (COPD) is a life-threatening lung disease that interferes with normal life. It is a growing cause of morbidity and mortality all over the world. More than 3 million people died of COPD in 2012, which is equal to 6% of all deaths globally that year. More than 90% of COPD deaths occur in low- and middle-income countries.

The prevalence and morbidity data greatly underestimate the total burden of COPD because the disease is usually not diagnosed until it is clinically apparent and moderately advanced. COPD is the fourth-leading cause of death in the USA and Europe, and COPD mortality in females has more than doubled over the last 20 years.
COPD is not only a single disease but a term used to describe chronic lung diseases that cause limitations in lung airflow.\textsuperscript{[2]}

It is characterized by a persistent blockage of airflow from the lungs. It is an under-diagnosed, life-threatening lung disease that interferes with normal breathing and is not fully reversible. The most common symptoms of COPD are breathlessness, abnormal sputum and a chronic cough. Daily activities worsen that leads to very low quality of life.\textsuperscript{[4]}

The primary cause of COPD is tobacco smoke - direct tobacco use or second-hand smoke. The disease now affects men and women almost equally, due in part to increased tobacco use among women in high-income countries.\textsuperscript{[2]}

At one time, COPD was more common in men, but because of increased tobacco use among women in high-income countries, and the higher risk of exposure to indoor air pollution (such as solid fuel used for cooking and heating) in low-income countries, the disease now affects men and women almost equally.\textsuperscript{[2]}

COPD is not curable, but treatment can slow the progress of the disease. It is essential to stop smoking to prevent the progression of COPD. Various forms of treatment can help control its symptoms and increase quality of life for people with the illness. For example, medicines that help dilate major air passages of the lungs can improve shortness of breath.\textsuperscript{[5]}

Currently, COPD is a more costly disease than asthma and, depending on country; 50–75% of the costs are for services associated with exacerbations. Tobacco smoke is by far the most important risk factor for COPD worldwide. Other important risk factors are occupational exposures, socio-economic status and genetic predisposition.\textsuperscript{[6]}

The burden of COPD assessed by disability-adjusted life years (DALYs) ranks 9th worldwide according to Top 10 causes of disease burden (DALYs), Australasia, Global Burden of Disease Study 2010. Total deaths from COPD are projected to increase by more than 30% in the next 10 years unless urgent preventive measures are in place. The direct and indirect costs of COPD to the U.S. in 2000 were estimated to be nearly $30.4 billion. Direct costs (expenditures for hospital care, physician and other professional care, home care, nursing home care, and drugs) accounted for $14.7 billion and indirect costs (lost earnings due to illness and lost future earnings resulting from death) were $15.7 billion.\textsuperscript{[7]}
Early detection and appropriate management of COPD may help to reduce the high mortality and morbidity associated with this disease. Currently the treatment of asthma/COPD favours the use of beta-2 agonists and inhaled corticosteroids, with leukotriene antagonists and anticholinergics being positioned as additional therapies in either paediatric or last-line patients.\[4\]

These facts prompt us to study Bulgarian COPD patients in terms of their demographic characteristics and the effects of occupational hazards, smoking and the duration of time from diagnosis on disease progression.

**MATERIALS AND METHODS**

An observational inquiry cohort multi-centered study was performed among patients diagnosed with chronic obstructive pulmonary disease from the cities in Northwest, Northeast, Southwest, Southeast Bulgaria and Sofia.

Information was gathered with application of a prebuild questionnaire. Patients and their physicians are provided with the questionnaire, containing questions about demographic characteristics, year of diagnosis and stage in GOLD, presence of professional hazards, smoking and disability.

The obtained data were processed statistically with the aid of the programs Microsoft Excel and SPSS by applying descriptive analysis and comparative independent T test.

273 patients were included – those are diagnosed and treated patients with COPD. According to the National Health insurance Fund for 2013 the number of patients diagnosed with COPD is 76 000 so these patients represent 0.34 %.

**RESULTS**

The mean age of the observed patients is 66.93±8.642. There is a prevalence of men and the men/women ratio is 3.27, that is a specific trend for Bulgaria as the old pattern of distribution is achieved. The average duration of disease since diagnosis for these 273 patients is 32 years. Nearly 34% from the patients are still active smokers. The most frequent degree of severity of COPD is 5 – that corresponds to moderate degree according to the GOLD classification. (Table 1).
Table 1. Demographic characterization of the patients.

<table>
<thead>
<tr>
<th>Demographics</th>
<th>n=273</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>66.93±8.642</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>64</td>
</tr>
<tr>
<td>Male</td>
<td>209</td>
</tr>
<tr>
<td>male/female ratio</td>
<td>3.27</td>
</tr>
<tr>
<td>Cigarette smoker (%)</td>
<td>33.7</td>
</tr>
<tr>
<td>Duration of disease since diagnosis (years)</td>
<td>32±5.803</td>
</tr>
<tr>
<td>Severity of COPD (%)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7.3</td>
</tr>
<tr>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>3</td>
<td>30.8</td>
</tr>
<tr>
<td>4</td>
<td>8.4</td>
</tr>
<tr>
<td>5</td>
<td>35.2</td>
</tr>
<tr>
<td>6</td>
<td>17.6</td>
</tr>
<tr>
<td>Professional hazards (%)</td>
<td>42.8</td>
</tr>
</tbody>
</table>

![Figure 1. The effect of risk factors on the severity of COPD.](image)

The correlation analysis shows that people without hazards are affected by COPD, but this is because the majority - over 50% were current or former smokers. 5 degree of severity is the widely spread degree of COPD among the patients and according to the correlation analysis it is also due to the hazardous factors such as work and pollution. (Figure 1)

**DISCUSSION**

The above results support an association between COPD and occupational factors. An increase in the degree of COPD is due to workplace factors, even after taking into account the impact of cigarette smoking. The severity of COPD contributed by occupation was
considerable, depending on the rating of COPD. That means that if there is elimination of hazardous workplace exposures we can expect decrease in the cases of COPD. This fact is obvious from the literature and it just confirms that Bulgaria is following the world tendencies.\cite{8,9}

The role of cigarette smoking appears to be complex. In the present analyses, evidence was found for an interaction between smoking and occupational exposures. Cigarette smoking remains the predominant aetiological factor in chronic obstructive pulmonary disease and is appropriately one of the main public health efforts in lung disease prevention.\cite{10}

So we can conclude that both healthcare providers and healthcare policy-makers have to assess the appropriateness of the workplace conditions among smokers, when targeting prevention strategies for COPD.\cite{11}

This observational approach, although widely used, can lead to overestimations due to the attribution of diagnoses that were not made or were not correctly made. Some studies documented that not all the patients with COPD are properly diagnosed and treated.

**CONCLUSIONS**

The study confirms that among the Bulgarian COPD patients the increased rate in GOLD is directly proportional to the hazard environmental factors and the smoking duration. Smoking and hazard factors such as workplace conditions are leading for the development of COPD.

**REFERENCES**

2. WHO. COPD. http://www.who.int/respiratory/copd/en/


11. Andreevska K., Petkova V., Dimitrova Zl., Analysis of the chronic obstructive pulmonary disease (COPD) pharmaceutical market, Archives of the Balkan Medical Union, 2011; 46(1): 73-76