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# COPD in Poland – risk factor and epidemiology

## Martyna Warchoł

Faculty of Medicine and Health Sciences, Jan Kochanowski University in Kielce, Al. IX Wieków Kielc 19, 25-317 Kielce, Poland

## Synopsis

Chronic obstructive pulmonary disease (COPD) falls under the category of civilization diseases. According to World Health Organization, its burden is expected to increase in the following decades, mainly due to constant exposition to the risk factors, population growth and ageing, to become the third most frequent cause of death until 2030. According to the guidelines of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) from 2015, COPD can be prevented and successfully treated. Despite the serious problem that is COPD, in many countries the data on this disease is insufficient. The most important risk factor leading to COPD that can be modified is smoking tobacco, the habit that is still popular among the adults. The knowledge of the risk factors and their elimination, as well as leading a healthy lifestyle and preference towards health behaviour that helps reducing the advancement of the disease should therefore become the basis for preventing COPD.

**Key words:** chronic obstructive pulmonary disease, risk factors, morbidity

## Introduction

Chronic obstructive pulmonary disease (COPD) is a serious epidemiologic, social and economical problem for the modern societies[Patel et all 2018, ss. 2301-2311]. It is also an important reason of morbidity and mortality rate in the world. Described for the first time by the French doctor René Laënneca, it is defined as coexisting bronchitis and pulmonary emphysema. The diagnostic gold standard is the anamnesis, physical examination and spirometry, the results of which determine the severity of the disease. The basic diagnostics also include chest X-ray, exercise tolerance and blood gas[Rysiak et all 2017, ss. 115-120].

Polish Society of Lung Diseases defines COPD as common disease that surrenders to prevention and treatment. In pathogenesis of COPD the significant meaning has the chronic inflammation process, caused by the exposition to the inhaled harmful particles and gases, that lead to increased oxidative stress and the imbalance between proteinases and anti-proteinases.

According to the guidelines by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) from 2015, COPD can be prevented and successfully treated. The disease is characterized by the limited flow of the air through the airways, that typically develops and is associated with the chronic intensified response from the airways and lungs to the harmful particles and gases [Kleniewska i in. 2016, ss.375-384]. The intensification of COPD are the factor that worsens the disease course, has a harmful effect on the respiratory system as well as the quality of life and results in worsen prognosis [Ucińska i in 2012, ss. 140-145]. Some part of the people affected by the disease live many years with intensified symptoms of chronic respiratory insufficiency, while others die “suddenly” for the close ones and the medical staff during one of the intensifications. The results of COPD intensification analysis point out that they occur mostly to the diseased with severe or highly severe chronic obstructive pulmonary disease [Jassem i in. 2013, ss. 37-40; Krion i in. 2017, ss. 263-269].

## Epidemiology

Chronic obstructive pulmonary disease (COPD) falls under the category of civilization diseases. According to World Health Organization, its burden is expected to increase in the following decades, mainly due to constant exposition to the risk factors, population growth and ageing, to become the third most frequent cause of death until 2030. COPD is already now the third most frequent cause of death in the United States, and the third cause of disability among people over 65. The Global Burden of Disease examination reported occurrence of 251 million of COPD cases all over the world in 2016. It is estimated that in the whole world in 2015, 3.17 million deaths had been caused by the disease (that is 5% of total deaths across the world in

that year), which is the 11.6% increase compared to the year 1990. More than 90% of deaths by COPD occur in countries of low and medium birthrate. From 1990 to 2015 the COPD spread increased by 44.2% [WHO; GBD Collaborators 2017, ss. 691-706].

There are no exact epidemiologic research stating the number COPD sufferers in Poland. According to estimates, this number crosses over two million, and 20% of those suffer from advanced stage of the disease. The results of international BOLD research (Burden of Obstructive Lung Disease) that had taken place also in Poland, shown that the frequency of COPD occurrence in our country is way higher than previously anticipated (10% of examined population) [Nizankowska – Mogilnicka i in. 2007,ss. 402-409; Bednarek i in. 2008, ss. 402-407].

It is estimated that roughly only 1/3 of these people had been diagnosed. Currently, due to COPD and its complications around 15 thousand people in Poland die every year. The disease stands as a major societal burden, that is because almost 20 thousand of disability pensions are being granted every year due to this disease, and majority of them is given to people of production age, between 50 and 60 years old [Wasilewski 2017, ss. 72-81]. According to data published by the Lazarus Institute, due to the chronic diseases of lower airways, 137.2 thousand sick leaves had been given in 2012, resulting in total of 1535.0 thousand days of absence at work [Drapała i in. 2014].

Despite the serious problem that is COPD, the knowledge about this disease in many countries is insufficient. Among 50 of the European countries only 19 (38%) of them possess reliable data on its spreading [Adeloye i in 2015, 020415].

**Risk factors**

The most important risk factor advancing COPD that can be modified is smoking tobacco [Górecka i in. 2012, ss. 220−254; Jassem i in. 2010, ss. 126−132; Liu i in. 2015, ss. 1409-16]. Risk of advancing COPD also include other environmental types of inhalation detriment, respiratory tract infections and the genetic factors, such as alpha-1 antitrypsin insufficiency[Albertson i in. 2011, ss. 1-14]. COPD also occur to non-smokers, who make up 20-30% of total people suffering from COPD. The risk factors to non-smokers include age, second-hand smoking and previous diagnosis of asthma[Hagstad i in. 2015, ss. 1439-1445].

The further significant risk factor that are responsible for 10-20% of COPD cases include being occupationally exposed to dust (coal, silicon), chemical substances and harmful gases (1, 10). If the exposition is prolonged and/or intense, the disease may develop regardless of being a non-smoker. The interaction of risk factors, such as smoking tobacco, air pollution,

occupational exposure to dust, may all accumulate. The development of the disease may also be influenced by the viral and bacterial infection[Iwanicka-Michałowicz 2009, ss. 27-32].

The air pollution influences chronic obstructive pulmonary disease and the initial symptoms. As shown by WHO, in the urban areas that monitor the level of air pollution, more than 80% of people is exposed to the danger of pollution that crosses beyond the WHO norms. The most frequent air pollutants come from burning of the oil and its derivatives as well as burning of coal. High concentration of dust occur near the industrial factories using aforementioned fuels, as well as in the cities and in the direct neighborhood of roads with high traffic[Pierzchała i in. 2010, ss. 318-347].

However, one can defend himself from these pollutants by supplementing his diet in the appropriate vitamins and nutrition. More and more evidence suggests that carotenoids, D vitamin and E vitamin protect from the damages caused by the pollution that may cause asthma, COPD or initiate lung cancer. C vitamin, curcumin, choline and omega-3 fat acids can also serve protective role. Mediterranean diet seems to be beneficial for the respiratory tract, but there is no evidence pointing to its protective influence, save for the cigarette smoke[Whyland i in. 2018, ss. 2-14].

The development of COPD is also affected by the pollution in the accommodation spaces. These include mostly second-hand smoking and the pollution from coal, wood or gas usage for warming the apartment and for cooking in rooms with poor ventilation.

The risk factors for COPD also include chronic bronchitis of young people who smoke tobacco[Śliwiński i in. 2014, ss. 227-263]. The risk of falling ill to COPD is increased also in case of returning infections of lower respiratory tract, especially before the third year of life. That is because it may irreversibly damage peripheral structures of the lungs, leading to permanent disability of their actions in the age of 20-25, when the ventilation reserves of lungs are at their highest. The risk factors also include chronic bronchitis of young people smoking tobacco and suffering from asthma[Górecka 2012, ss. 223-225].

The COPD development is not as much influenced by the gender nowadays. The research shows that no more than couple of decades ago, it was more common for men to die from the discussed disease than it was for the women. Nowadays it has been proven that COPD occurs in similar frequency to males and females, which may be caused by the similar number of tobacco smokers among both genders[Stelmach i in. 2016, ss. 69-80].

It is believed that the COPD burden is high in some countries with high income (HIC), mostly due to the very common smoking in those places. However, it has been estimated that despite high percentage of COPD in some HIC, 90% of deaths from COPD still occur in low

or medium income countries (LMIC) and 40% of these deaths can be attributed to smoking tobacco[Adeloye i in. 2015, 020415].

The knowledge of the risk factors and their elimination, as well as leading a healthy lifestyle and preference towards health behaviour that helps reducing the advancement of the disease should therefore become the basis for preventing COPD. Majda Józefowska's research confirms that there is the need for increased involvement in the betterment of personal resources for patients with COPD, such as the feeling of self-efficiency and motivation to switch to health behaviour by both doctors and nurses[Majda i Józefowska 2009, ss. 283-293].

The main problem connected with late diagnosis of chronic obstructive pulmonary disease is the low social awareness of the disease. Only 25% of sufferers have diagnosed COPD. According to the research led by the "Lungs of Poland" campaign, the knowledge of COPD is lesser than other lungs' diseases. The connotations with the COPD abbreviation are accurate, but rare. Every second person believes, that it is possible to prevent COPD. More women are familiar with the disease than men, as well as the people from the oldest group (60+) and the citizens of the biggest cities[Raport Polski, s.14].

**Summary**

Epidemiologic prognosis points out that the morbidity and mortality due to the chronic obstructive pulmonary diseases will increase systematically, due to the higher number of people being over 65, environmental pollution and smoking tobacco addiction – in Poland more or less 9 million adults smoke. It poses a challenge for the healthcare system and the politics of the country. The access to the prevention, early diagnosis and treatment is insufficient and gets worse gradually. The health education is an important aspect in the case of COPD, because the social awareness of this disease is low, especially when it comes to risk factors and initial symptoms.

To summarise – from the perspective of public well-being, COPD poses a significant challenge. The challenge that aims at all the sectors of holistic public health: health education, prevention, and the organisation of early diagnostics, rehabilitation etc.

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