

# Gender Related Differences in Reported Respiratory Symptoms

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## Abstract

**Background:** Physiological research on dyspnea has provided some information on how sex differences in lung and airway size can influence the experience of dyspnea during exercise; however, there is still a knowledge gap with regard to sex-related differences in other respiratory symptoms, including cough and sputum production.

**Objective:** The objective of this analysis was to assess sex related differences in reported objective symptoms using data from the population-based Burden of Obstructive Lung Disease (BOLD) study in Albania.

**Method:** Males and females with impaired lung function may experience the same symptoms but perceive and/or report them differently. In this analysis were included 997 responders who had completed the core questionnaire, which included data on respiratory symptoms using the following questions: "Do you usually cough when you don't have a cold?" and "Do you usually bring up phlegm from your chest, or do you usually have phlegm in your chest that is difficult to bring up when you don't have a cold. Chronic was defined as three months or more per year. Data used were drawn from the final report for Albania provided by BOLD team.

**Results:** Overall, male gender was associated with increased odds for reported chronic cough at any group age [Total: 14.7 (2.3) vs. 6.6 (0.9)]. This difference is very much reduced in the group age 70+ years old [25.8 (8.2) vs. 21.3 (6.8)]. In the contrary when we used the estimated population prevalence of chronic cough by pack-years and gender, female gender was associated with increased odds for reported chronic cough especially in the 10+ pack-years groups [50.4 (11.0) vs. 12.2 (8.3) in 10-20 pack-years and 29.0 (5.5) vs. 26.0 (3.3) 20+ pack-years] indicating a increased smoking susceptibility of female gender. In contrast, female gender was associated with decreased odds for reported phlegm. Even for the same pack-years of smoking, female gender is associated with decreased odds for reported chronic phlegm [0 vs. 7.1 (8.6) in 10-20 pack-years group; 0 vs. 15.4 (3.0) in 20+ pack-years group].

**Conclusions:** Physicians need to recognize that although a female may not report chronic sputum or phlegm production and a male may not report chronic cough, a diagnosis of Chronic Obstructive Pulmonary Disease should still be considered as symptoms often are the first step to a diagnosis of underlying airway disease.

**Key words:** Respiratory symptoms, gender, differences, chronic cough, COPD.

## Introduction

COPD is the fourth leading cause of death globally. It is a preventable and treatable disease, characterized by persistent airflow limitation and impaired lung function. The diagnostic algorithm of chronic bronchitis, emphysema or COPD begins with reporting respiratory symptoms to the physician. It remains a major public health problem. Individuals with COPD have recurring acute exacerbations, frequent hospital admissions, poor survival, significant depressive symptoms as well as physical symptoms of cough sputum production, and shortness of breath, and impaired physical functioning and quality of life. Physiological research on dyspnea has provided some information on how sex differences in lung and airway size can influence the experience of dyspnea during exercise; however, there is still a knowledge gap with regard to sex-related differences in other respiratory symptoms, including cough and sputum production. The objective of this analysis was to address if there is any difference with regard to respiratory symptoms in males and females with normal and impaired lung function using data from the national population-based Burden of Obstructive Lung Disease (BOLD) study in Albania [2]

## Material and method

### Target population

A nation-wide representative sample was drawn. Target population was non-institutionalized adult men and women aged  $\geq 40$  years.

### Sampling procedure

A multi-stage cluster sample of 1200 individuals (600 men and 600 women) aged  $\geq 40$  years was drawn based on the sampling frame (alias the target population) available from the National Institute of Statistics (INSTAT), which consisted of 1,168,721 men and women aged  $\geq 40$  years using year 2004 Census data about population in Albania. It was BOLD Coordinating Center approved and based the BOLD criteria of generalizability of target population meaning that that area should have a total population of all ages of at least 150,000 people.

## Recruitment of participants

Participants were contacted through home visits. Individual in our study were randomly selected but in a systemic approach reaching only those that were easy find. Our recruitment approach was based on family physician registry. Clustering process was made based on BOLD sample PLAN: strata 1- random selection of 3 prefectures out of 12 nationwide; strata 2 - random selection of adults  $\geq 40$  years living in already selected prefectures, further substratified accorded to their gender and place of residence, rural vs. urban.

## Study measures

Spirometry was done using the ndd EasyOne™ spirometer, compliant with American Thoracic Society spirometry standards. Measurements were made before and at least 15 min after two puffs of albuterol (200 mg) administered via a metered-dose inhaler. Spirometry data were sent electronically to the Coordinating Center in London City, UK, where each spirogram was reviewed and graded using American Thoracic Society guidelines, to assure maximum quality of the data and to provide ongoing feedback regarding the adequacy of the maneuvers. Usable spirometers met American Thoracic Society acceptability and reproducibility criteria (at least two acceptable and reproducible tests for both FEV1 and FVC). To calculate the percentage of predicted values for the analysis, reference equations from the NHANES III were used.

## Questionnaire Data

Presence of self-reported cough was assessed using the following question: "Do you usually cough when you don't have a cold?" Self-reported phlegm was based on the answer to the following question: "Do you usually bring up phlegm from your chest, or do you usually have phlegm in your chest that is difficult to bring up when you don't have a cold?" Presence and severity of self-reported dyspnoea was recorded according to the modified Medical Research Council (mMRC) dyspnoea scale (0–4). Severe dyspnoea was defined as mMRC grade 3–4. These questions were

part of BOLD core questionnaire which contained information on welfare, educational and health status, respiratory symptoms and diseases, medication use, co-morbidities, risk factors for COPD including smoking status, health-care utilization, and activity limitation.

### Definitions

Demographic data included in this analysis were age, gender, urban vs. rural and educational status. The study participants were classified based on Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria and post

bronchodilator spirometry: normal (no respiratory symptoms or airflow obstruction or restriction); GOLD stage 0 (the presence of symptoms of cough, sputum, wheeze, or breathlessness without airflow obstruction or restriction); GOLD stage 1 or higher when post-BD FEV1/FVC < 70% and post-BD FEV1 < 80% of predicted; GOLD stage 2 when post-BD post-BD FEV1/FVC < 70% and post-BD FEV1 50 to 80% of predicted; GOLD

stage 3 or 4 when post-BD FEV1/FVC < 70% and post-BD FEV1 < 50% of predicted); and restricted (FEV1/FVC 0.70 and FVC 80% of predicted). For study purpose, participants with spirometers showing obstructive pattern were grouped as GOLD stage 1 and higher into a single "obstruction" group with a further subdivision as GOLD stage 2 and higher. In the analysis were included estimated population prevalence of chronic cough and chronic phlegm by age and gender, estimated population prevalence of self-reported chronic bronchitis by age and gender. Based on smoking status participants were classified as current smokers, former smokers, or never-smokers based on self-reported history.

### Statistical Analysis

Logistic regression was used for evaluation of gender -differences and all results were adjusted for smoking status (current, ex- or never-smoker), age, and body mass index.

Age					Total
Gender	40-49	50-59	60-69	70+	
Male	8.1 (3.5)	11.2 (1.3)	23.9 (4.2)	25.8 (8.2)	14.7 (2.3)
Female	3.2 (1.4)	2.9 (1.3)	5.1 (3.7)	21.3 (6.8)	6.6 (0.9)
Total	5.6 (1.9)	7.1 (1.0)	14.5 (3.5)	23.3 (5.3)	10.6 (1.3)

**Table1. Estimated Population Prevalence (SE) of Chronic Cough<sup>1</sup> by age and Gender for Tirana, Albania**

Reported cough for three months or more per year

Pack - years					Total
Gender	Never Smokers	0-10	10-20	20+	
Male	1.7 (1.3)	1.1 (1.4)	12.2 (8.3)	26.0 (3.3)	14.7 (2.3)
Female	4.1 (1.6)	0	50.4 (11.0)	29.0 (5.5)	6.6 (0.9)
Total	3.4 (1.2)	0.6 (0.7)	28.0 (8.4)	26.1 (3.2)	10.6 (1.3)

**Table2. Estimated Population Prevalence (SE) of Chronic Cough<sup>1</sup> by pack-years and gender for Tirana, Albania**

Reported cough for three months or more per year

Gender	Age				Total
	40-49	50-59	60-69	70+	
Male	1.7 (1.2)	2.3 (1.4)	4.3 (1.8)	8.7 (5.6)	3.4 (1.9)
Female	1.3 (0.9)	0.3 (0.3)	0	0	0.5 (0.3)
Total	1.5 (0.8)	1.3 (0.7)	2.1 (1.0)	3.9 (2.6)	2.0 (1.0)

**Table3. Estimated Population Prevalence (SE) of Chronic Phlegm<sup>1</sup> by age and gender for Tirana, Albania**

1. Reported phlegm for three months or more per year

Gender	Pack - years				Total
				20+	
Male	0.5 (0.5)	0	7.1 (8.6)	5.4 (3.0)	3.4 (1.9)
Female	0.6 (0.4)	0	0	0	0.5 (0.3)
Total	0.6 (0.3)	0	4.1 (4.7)	5.3 (2.9)	2.0 (1.0)

**Table 4. Estimated Population Prevalence (SE) of Chronic Phlegm<sup>1</sup> by pack-years and gender for Tirana, Albania**

1. Reported phlegm for three months or more per year

group; 0 vs. 15.4 (3.0) in 20+ pack-years group].

## Results

Overall, male gender was associated with increased odds for reported chronic cough at any group age [Total: 14.7 (2.3) vs. 6.6 (0.9)]. This difference is very much reduced in the group age 70+ years old [25.8 (8.2) vs. 21.3 (6.8)]. In the contrary when we used the estimated population prevalence of chronic cough by pack-years and gender, female gender was associated with increased odds for reported chronic cough especially in the 10+ pack-years groups [50.4 (11.0) vs. 12.2 (8.3) in 10-20 pack-years and 29.0 (5.5) vs. 26.0 (3.3) 20+ pack-years] indicating a increased smoking susceptibility of female sex.

In contrast, female gender was associated with decreased odds for reported phlegm. Even for the same pack-years of smoking, female gender is associated with decreased odds for reported chronic phlegm [0 vs. 7.1 (8.6) in 10-20 pack-years

## Discussion

This is in accordance with results from the Confronting COPD International Survey, which showed that despite lower pack-years of smoking females were more likely to report cough and less sputum [4]. Females are held to an expectation of beauty and youthfulness, whereas males are expected to be physically strong and robust. These expectations may be disrupted by COPD [9]; however, these expectations may influence the perception and expression of respiratory symptoms in males and females. Thus, males might be less likely to describe themselves as breathless than females, and females might be less likely to report sputum or phlegm production.

## Conclusion

Physicians need to recognize that although a female may not report sputum or phlegm produc-

tion and a male may not report dyspnoea, a diagnosis of COPD should still be considered. Knowledge of this difference in reporting symptoms is

important as symptoms often are the first step to a diagnosis of underlying airway disease.

## References

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