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COPD prevalence in a north-eastern Italian general population

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KEYWORDS

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Summary

Background: COPD prevalence estimates vary mostly depending on different study methodologies. We evaluated the prevalence and clinical features of COPD, as defined by GOLD and ERS/ATS recommendations in a representative sample of Northern Italy general population.

Methods: A randomized cross-sectional study was performed. The study participants completed a questionnaire covering: key indicators for considering a diagnosis of COPD, self-reported physician diagnoses of respiratory disease, pharmacological treatment for respiratory disease, indirect costs, occupational and environmental exposures. They also underwent spirometry and physician assessment.

Results: We evaluated 1236 subjects. Daily respiratory symptoms were experienced by 26.7%. Of this group, only 30.7% had previously performed a spirometry. The overall COPD prevalence was: 11.7% according to GOLD criterion; 9.1% according to LLN criterion; 6.8% according to self-reported physician diagnosis. Of note, 48.8% of subjects with a reported diagnosis of COPD had never undergone a spirometry before the study.

Conclusions: Our study provides an estimation of COPD prevalence in a representative sample of Northern Italy general population relying on both clinical symptoms and spirometry

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outcomes, and describes the different prevalence rates depending on the adopted diagnostic criterion. Spirometry underuse may account for under-diagnosis and misdiagnosis of COPD. It may result in a major impact on quality of life as well as in economic burden.

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of death. It also significantly impacts on disability, quality of life and health care costs [1,2]. Despite its increasing burden, many published epidemiological studies suffer from methodological biases and are characterized by a wide variability in terms of estimated prevalence rates [2]. According to available estimates COPD affects million people worldwide [3] and its prevalence ranges from 4 to 14%, up to 50% in elderly smokers [1,2,4,5]. Many sources of variability have been outlined: the use of different diagnostic criteria, different methods for data collection and different population samples [6]. Two main spirometric thresholds have been used in the past years for defining airflow obstruction: the fixed threshold (FEV_1/FVC ratio <0.70), suggested by the Global Initiative for Obstructive Lung Disease (GOLD) recommendations [7], and the Lower Limit of Normal (LLN) at the 5th centile, according to the ERS/ATS document [8]. The large variability in prevalence estimates depending on the definition of airway obstruction has been clearly highlighted [1,2].

Few epidemiological studies on COPD prevalence in the general population have been carried out in Italy. Viegi et al. conducted in 2000 a cross-sectional spirometry-based epidemiological survey of a general population sample living in North Italy [9]. The overall prevalence of airway obstruction according to the two above-mentioned spirometric criteria ranged from 11% to 18.3%, mostly depending on age, smoking habit and the criterion used for airways obstruction definition. More recently an Italian multicentre study [10] reported the prevalence of COPD ranging from 3.3% in the youngest age group to 13.3% in the oldest age group.

Our study aims at evaluating the prevalence of COPD by comparing the GOLD criterion and the ERS/ATS criterion (LLN, based on the Global Lung Function 2012 equations) criteria in a representative sample of the Northern Italy general population.

Material and methods

Study design

This observational cross-sectional study involved subjects aged between 18 and 79 years. Participants were randomly recruited among people living within Verona district. The municipal registry was used as the data source.

Fig. 1 shows the recruiting phases flow chart. An invitation letter was sent via regular post, followed by phone recall to promote participation in the study. An interviewer-administered questionnaire based on questions

coming from different validated tools [7,10] was used. It was composed of 51 multiple-choice and open questions on: dyspnoea, chronic cough, chronic sputum production, history of exposure to risk factors, self-reported physician diagnoses of respiratory disease, chronic and on demand pharmacological treatment for respiratory disease. Indirect costs (missed work and leisure days) were also evaluated. The questionnaire also included questions on risk factors such as occupational and environmental exposures (i.e. living close to light or heavy traffic roads or both, living close to industries). In order to rule out a selection bias, a representative sample of non-responders was also evaluated through CATI (Computer-Assisted Telephone Interviewing) technique. The phone interview included a short version of the questionnaire covering the same items.

Spirometry was performed through a Spiro Scout with ultrasound sensor, Ganshorn Medizin Electronic Niederlauer BRD. Physical examination was performed by a pulmonologist. In the presence of $FEV_1/FVC <70\%$, a post bronchodilator spirometry (after the administration of 400 mcg salbutamol) was performed. The procedure met the ATS/ERS standards [11,12] for acceptable equipment and technique. In line with international recommendations [7] a possible clinical diagnosis of COPD was considered in any patient referring dyspnoea, chronic cough or sputum production, and a history of exposure to risk factors. Airway obstruction was estimated according to the following criteria: GOLD, as post bronchodilator $FEV_1/FVC <70\%$ [14]; ERS/ATS, as post bronchodilator $FEV_1/FVC < LLN$ at 5th centile [8]. For the latter, the Global Lung Function (GLI) 2012 spirometric prediction equations were used [13]. Airway obstruction was also recorded before bronchodilation, in order to analyze the impact of different diagnostic criteria (GOLD or ERS/ATS) and reversibility testing on disease definition. Study population was grouped into four categories based on subjects' pre- and post-bronchodilator FEV_1/FVC ratio combinations.

Approval was obtained from the Verona district ethics committee, and written informed consent about all the aspects of the research project was obtained from each participant. Data collection was performed between November 2011 and February 2012.

Statistical analysis

A sample size of 1788 individuals was considered appropriate in order to provide an acceptable level of precision ($SE < 1.5\%$) for estimating prevalence of COPD in the area under study. Results are expressed as mean and standard deviation or median and IQR if variables are continuous or ordinal, as percentage if variables are categorical. Shapiro Wilk test was used to test the normality distribution for

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