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How to unveil chronic respiratory diseases in clinical practice? A model of alliance between general practitioners and pulmonologists

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ABSTRACT

Introduction: Asthma and COPD are under-diagnosed and undertreated in adult populations, mainly due to the discrepancy between guideline recommendations and clinicians' practices. One of the reasons of this discrepancy is the difficulty encountered in *real life* in sharing the management of chronic respiratory diseases between general practitioners (GPs) and respiratory physicians.
Methods: An explorative, population-based investigation was performed to test whether, and to what extent, an active collaboration between GPs and pulmonologists increases the diagnosis and proper treatment of chronic obstructive airway diseases. The "COPD action" involved an in-house intervention by pulmonologists who trained GPs on how to diagnose the disease and interpret the spirometry, yielding a final agreed diagnosis.
Results: A total of 210 subjects (M/F: 156/54; age: 62.5 ± 13.8, mean ± SD) were consecutively invited by 20 GPs and classified in a) healthy, b) symptomatic with no airway obstruction, and 3) affected by chronic respiratory diseases. 11% of previously defined "healthy" subjects were diagnosed with COPD, and symptomatic subjects were diagnosed with asthma (20%) or COPD (23%). In addition, in those who already carried a diagnosis of chronic respiratory diseases as judged by GPs, the diagnosis of COPD decreased significantly after respiratory specialist intervention ($p = 0.001$), in favor of asthma and chronic bronchitis. Furthermore, following the clinical and lung function assessments performed by the respiratory physicians, changes in inhaled treatments were statistically significant for each therapeutic category (test-retest reliability: $r = 0.42$; $p < 0.001$).
Conclusion: In conclusion, the collaboration between GPs and pulmonologists based on a pro-active approach to the individuals attending the primary care offices followed by an in-house intervention by specialists may largely improve the diagnosis and management of chronic respiratory diseases.

1. Introduction

Chronic obstructive respiratory diseases are characterized by a high health and socio-economic burden due to the growing prevalence in the general population and to their impact on patient's quality of life. Nevertheless, asthma and chronic obstructive pulmonary disease (COPD) are still underdiagnosed and undertreated in adult populations [1–3]. In addition, a significant discrepancy has been reported between guideline recommendations and clinicians' practices [4–7]. An Italian study suggested that a high number of individuals affected by chronic obstructive respiratory diseases has poor control of respiratory symptoms, and this finding could be attributed to the tendency of general practitioners (GPs) to estimate suboptimally the severity of respiratory diseases, resulting in a lack of pharmacological treatment adjustments according to the disease severity [8]. Moreover, it has been demonstrated that physicians not rarely prescribe inhalation treatment in the absence of lung function assessment, thus without taking into account the severity of airway obstruction [2]. This leads to inadequate patient management, such as the inappropriate prescriptions of inhaled corticosteroids (ICS) in COPD patients with mild/moderate disease, and induces escalating healthcare costs [7,9]. Obviously, the lack of

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List of abbreviations

COPD	Chronic Obstructive Pulmonary Disease
GPs	General Practitioners
GOLD	Global Initiative for Chronic Obstructive Lung Disease

information on functional evaluations also increases the misdiagnosis of asthma or COPD.

One of the reasons of the dissociation between guideline recommendations and clinicians' practices can be detected in the difficulty encountered in *real life* in sharing the management of chronic respiratory diseases between GPs and respiratory medicine specialists. A pilot explorative population-based investigation (named "COPD action") was conducted to test the hypothesis that a "pro-active" approach by GPs followed by an "in-house" intervention by respiratory specialists leads to increased diagnoses and proper treatment of chronic obstructive airway diseases, promoting and disseminating the guidelines among the primary care physicians.

2. Material and methods

An exploratory investigation was conducted in Alcamo, a town of 45000 inhabitants in Western Sicily, Italy. Consecutive subjects attending the primary care office were invited by their GP to undergo clinical and lung functional assessments by a pulmonologist at the GP's office, provided that they had already diagnosed with asthma or COPD, or complained of chronic respiratory symptoms, or exposed to environmental risk factors (i.e. cigarette smoke). All GPs working the town were invited to participate to the investigation. Since the purpose of the project was to show that implementing the collaboration between GPs and pulmonologists may enhance the diagnostic process towards COPD, the pulmonologists already knew the diagnosis at entry. Functional assessment was performed using a portable spirometer (Vitalograph ALPHA, United Kingdom). Measurements were made in accordance to the European Respiratory Society standardisation of lung volume measurements [10]. In addition, demographic information were registered, and medical and drug history were recorded for each patient and lawfully stored. Each subject provided his/her consent to use demographic and clinical information for scientific purposes. Given the nature of the investigation, no formal authorisation by ethics committee was necessary, and data were managed according to privacy rules.

2.1. Statistical analysis

Normally distributed data are reported as means ± SD. Comparisons were performed by parametric (Student's *t*-test) or non-parametric tests (Mann-Whitney U and Kruskal–Wallis tests), as appropriate. Test-retest reliability was performed to evaluated the difference between treatment before and after respiratory physicians intervention. For each test, a p value of less than 0.05 was taken as the threshold of statistical significance.

3. Results

20 GPs agreed to participate to the study and enrolled a total of 210 subjects (M/F: 156/54; age: 62.5 ± 13.8, mean ± SD). Subjects were classified by GPs in three groups: Group 1 (healthy), free of respiratory symptoms, exposed to environmental risk factors, and no diagnosis of respiratory disease (n: 47); Group 2 (symptomatic), with dyspnea or cough and no diagnosis of respiratory diseases (n: 86); Group 3 (asthma or COPD), with a previous diagnosis of chronic respiratory disease (n: 52 COPD and 25 asthmatics). All subjects underwent the clinical and lung function assessments by pulmonologists. Demographic and lung functional characteristics of the selected population are shown in Table 1.

Group 1 (M/F: 33/14; age: 56.2 ± 14.5 yrs) consisted of 35 current smokers (CS), 11 former smokers (FS), 1 never smokers, (NS). After the clinical and functional evaluations by the pulmonologist, five subjects belonging to this group (11%) showed clinical characteristics and spirometric features of airway obstruction, which was not significantly reversible after the inhalation of salbutamol 400 μg, and were classified as COPD. Based on the degree of lung function impairment, 2 subjects had mild airway obstruction, and 3 subjects had moderate (n: 1) and severe (n: 2) airway obstruction, respectively.

Group 2 (M/F: 65/21; age: 62.7 ± 12.7 yrs) was represented by 42 CS, 27 FS and 17 NS. Among this group, only 14% were classified as healthy (free of respiratory diseases), whereas the clinical and lung function assessments by pulmonologist led to 23% new diagnoses of COPD, 31% of chronic bronchitis with no airway obstruction, 20% of asthma, 3% of suspected interstitial lung disease. 9% of diagnoses remained undetermined because of unacceptable quality of the functional tests. Twenty-eight subjects belonging to this group showed spirometric features of airway obstruction, most of which (70%) was not significantly reversible after the inhalation of salbutamol 400 μg. The results of the lung function assessment, together with the clinical history and respiratory symptoms, led to the diagnosis of COPD.

Group 3 (M/F: 59/18; age: 65.7 ± 13.5yrs) was represented by 22 CS, 38 FS and 17 NS. Thirty-four subjects belonging to this group showed airway obstruction. In twenty-three of them, the airway obstruction was not significantly reversible after the inhalation of salbutamol. Among this group, 3% of patients had received an erroneous diagnosis of chronic respiratory disease. New diagnoses were posed by the pulmonologist: in particular, 45% of subjects were classified as affected by COPD, 8% by chronic bronchitis, 36% by asthma and the remaining 8% remained undetermined, due of unacceptable quality of the lung functional test. Overall, the diagnosis of COPD decreased significantly after respiratory specialist intervention ($p = 0.001$), in favor of asthma and chronic bronchitis.

Fig. 1 shows how the diagnosis changed after the collaborative interaction between GPs and pulmonologists. Furthermore, changes in inhaled treatment were statistically significant for each therapeutic category (test-retest reliability: $r = 0.42$; $p < 0.001$), suggesting the need of treatment adjustment according to the degree of airway obstruction or the changed diagnosis (Table 2).

4. Discussion

This explorative, population-based investigation aimed to establish whether a "pro-active" approach by GPs followed by an "in-house" intervention by specialists leads to increased diagnoses and proper treatment of chronic obstructive airway diseases. The main findings are: 1) new diagnosis of COPD in individuals previously classified as free of respiratory diseases, but exposed to environmental risk factors (Group 1); 2) new diagnoses of obstructive respiratory diseases in symptomatic subjects (Group 2); 3) statistically significant switches among classes of inhaled drugs for each therapeutic category in patients classified as affected by respiratory diseases (Group 3). Overall, these findings strongly indicate that COPD and asthma are largely underdiagnosed in adult populations, and that a significant proportion of individuals