Prevalence of COPD in Greece*

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Objectives: **The prevalence of COPD in Greece is unknown. The aim of this study was to determine the prevalence and trends of COPD among adults in Greece.**
Methods: **This study involved 888 randomly identified adults (475 men and 413 women) aged > 35 years, and smokers of at least 100 cigarettes, in a population-based, multiregional, cross-sectional descriptive design. The selected individuals reflected the urban/rural population distribution in Greece and, within each study region, the age group and gender of the community setting. The diagnosis of COPD was based on clinical and spirometric data including reversibility test (ΔFEV_1 < 15%).**
Results: **The overall prevalence of COPD in the population aged > 35 years with a smoking history of > 100 cigarettes per lifetime was 8.4%. The gender-standardized COPD prevalence was 11.6% for men and 4.8% for women. The COPD prevalence by community setting was as follows: Athens, 6%; other urban areas, 10.1%; semiurban areas, 8.5%; and rural areas, 9.1%. Smoking intensity and age were significantly associated with higher COPD prevalence in both men and women.**
Conclusions: **COPD is a substantial health problem in Greece, although prevalence rates are lower than expected when the high smoking rates are taken into account. The high proportion of the patients with mild COPD who were unaware of their illness highlights the need to increase public awareness of COPD.** ***(CHEST 2004; 125:892–900)***

Key words: chronic bronchitis; COPD; emphysema; epidemiology; prevalence; smoking

Abbreviations: CI = confidence interval; OR = odds ratio; EU = European Union

COPD continues to be among the leading causes of morbidity, mortality, and disability worldwide.[1] International efforts demonstrate the global imperative to improve the diagnosis and management of COPD.[2,3] It is well known that the reported prevalence of COPD varies throughout the world,[1] and this is due to the use of different sampling schemes, diagnostic criteria, and measurement modalities.[4] Population-based studies[1,4–9] were conducted in various countries, such as the United States, Spain, Italy, Norway, Denmark, and Japan; in these studies, objective lung function assessment was used and an overall COPD prevalence of 4 to 10% in the general adult population was reported.

Data of comparable methodologies are lacking from other regions of the world, including Greece. Three studies[10–12] have provided prevalence estimates for COPD in Greece, although none used a standard definition to diagnose COPD; the reported prevalence in these studies ranged between 9.6% and 17.1%. Tzonou et al,[13] having studied 110 COPD cases in Athens, suggested that individuals who had lived entirely in urban areas had a twofold greater risk of COPD than those who had lived in rural areas before moving to Athens, and that smokers had a tenfold greater risk than nonsmokers. However, a 1992 survey[14] of smoking in European Union (EU) countries reported that Greece had the highest prevalence of heavy smokers. In addition, in the early 1990s, Greece was found to have the highest *per capita* cigarette consumption in the EU,

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averaging approximately 3,600 cigarettes. The strong relation between smoking and COPD is well documented[3,15]

Thus, there is a need for a population-based epidemiologic study in Greece designed to assess the true prevalence of COPD using standard definitions and objective measurements by spirometry.[3,16] The findings of this study can help health policy makers and providers, including physicians, to develop measures for better prevention and management of COPD in Greece. Therefore, the aim of this descriptive epidemiologic study is to estimate the nationwide prevalence of COPD and to identify the disease characteristics in Greece.

Materials and Methods

This population-based study employed a multiregional, cross-sectional design. Subjects were recruited using a stratified random sampling method. Representative regions and survey participants were selected in order to reflect the urban/rural population distribution in Greece: Athens, 30.0%; other urban regions, 29.0%; semiurban regions, 12.8%; and rural regions, 28.3%. At least one study site was established for screening in each of the nine main country provinces with more than three subdivisions such as city, town, or community. Within urban/rural regions and study sites, randomized town or rural communities were selected for screening (Appendix 2). Similarly, in big cities ($>$ 100,000 inhabitants) representative randomized town center and suburban areas were selected. Within each study region, individuals of specific age and sex strata were selected to reflect the distribution of the overall Greek population. Study recruiters systematically covered the selected town, city, or village by walking door-to-door and approaching one house in every 50 steps asking for participants fulfilling the selection criteria (gender and age strata) and the inclusion/exclusion criteria (see below). Remote farmhouses in rural areas were not included in this approach. Only one member from each household was finally recruited to participate in the study. A sample size of approximately 890 individuals was assembled to be studied based on the following factors: an expected 10% prevalence of COPD; desired precision for the calculated result of $\pm$ 5%; desired confidence level (α) of 0.05; power of the study ($1 - \beta$) = 0.80; patient participation, willingness, or compliance rate (50%); and other estimated errors (30%), including the percentage of patients who could not use a spirometer.

Inclusion criteria for the study were age $>$ 35 years and having smoked at least 5 packs of cigarettes during their lifetime. Individuals were excluded if they had any other pulmonary disease, history of lung cancer or lung resection, and comorbid conditions that precluded use of spirometry or bronchodilator challenge. Individuals unable or unwilling to give consent, and those currently participating in any clinical trial were also excluded. According to the sampling-estimated factors and the inclusion/exclusion criteria, 2,200 households including approximately 6,500 members are estimated to have been contacted in order to reach the desired final study group of the 890 participants.

Study data were collected using the PulmAssist Decision-Support System (Jaeger GmbH; Wuerzburg, Germany), an interactive clinical decision-support software tool coupled with a spirometer (PM2; Jaeger GmbH), for the enhancement of the appropriate diagnosis and management of patients with COPD and asthma. The PulmAssist device generates diagnostic information for obstructive airway disease using a series of computer algorithms. Spirometric results, including bronchodilation testing after inhalation of 200 μg of salbutamol, were entered into the diagnostic algorithm along with asthma history and symptoms such as dyspnea, cough, sputum production, age, and cigarette smoking history in order to assign the diagnostic grouping for the patient. A chest physician always confirmed the diagnosis that was generated by the PulmAssist software. In case of disagreement, the doctor's diagnosis was accepted. In addition, the PulmAssist device was used to collect information on demographics, clinical history, spirometric results, smoking history, and medication usage. Diagnosis categories assigned by the PulmAssist device were COPD, asthma, or mixed disease (*ie*, mixed COPD and asthma). COPD cases were defined as follows: reversibility test result of $<$ 15% improvement in FEV_1 compared to prebronchodilator FEV_1; or postbronchodilator improvement of $FEV_1 < 200$ mL, and $FEV_1/FVC < 70\%$ and no history of atopy or pattern of disease suggestive of asthma, and smoking history $>$ 5 pack-years. COPD disease severity was classified by FEV_1 (percentage of predicted) as follows: mild, $>$ 70%; moderate, 50 to 70%; and severe, $<$ 50%.[17] Self-reported information was collected on cigarette smoking status (*ie*, current, ex-smoker) and average number of cigarettes smoked per day and, thus, the number of years of smoking and pack-years of smoking were calculated.

Statistics

Continuous variables are expressed as means (SD), and prevalence rates as crude and standardized gender-adjusted, community-adjusted, and age-adjusted values. Student *t* test was used to compare continuous variables, and the χ^2 test was used to compare proportions; $p < 0.05$ was taken as statistically significant.

Results

Demographics

A total of 6,436 household members were contacted between March and May of 2001. From 6,436 individuals, 3,636 subjects were excluded due to the age/gender stratification and smoking history. From the remaining 2,800 individuals, 1,610 subjects were also excluded on the basis of willingness, participation, and compliance rate, while another 162 individuals also were excluded because of comorbidity (39 patients), refusing spirometry and other estimated errors. From the 1,028 individuals who attended the clinical evaluation, 140 subjects were excluded due to unacceptable spirometry. Finally, a group of 888 study participants completed the PulmAssist device evaluation. Male subjects comprised 53.5% of the study population. As displayed in Table 1, 44% of patients were between the age of 35 years and 50 years, and 40% were between the age of 50 years and 70 years. The remaining 16% of patients were $\geq$ 70 years old. The majority of participants lived in either urban (57.2%) or rural (30.7%) areas, while one tenth of the lived in semiurban areas. These data showed that the study participants

Table 1—*Demographic Characteristics of the Study Participants and Smoking Intensity

Characteristics	All Study Participants		
	Men	Women	Total
Age, yr			
35 to 49	40.4 (192/475)	47.2 (195/413)	43.6 (387/888)
50 to 59	22.3 (106/475)	15.3 (63/413)	19.0 (169/888)
60 to 69	21.3 (101/475)	22.3 (92/413)	21.7 (193/888)
≥ 70	16.0 (76/475)	15.3 (63/413)	15.7 (139/888)
Community setting			
Athens	26.5 (126/475)	29.8 (123/413)	28.0 (249/888)
Other-urban	30.7 (146/475)	29.5 (122/413)	30.2 (268/888)
Semiurban	12.0 (57/475)	11.9 (49/413)	11.9 (106/888)
Rural	30.7 (146/475)	28.8 (119/413)	29.8 (265/888)
Smoking history			
Current smoker	48.4 (230/475)	61.0 (252/413)	54.3 (482/888)
< 15 pack-years	25.7 (122/475)	43.8 (181/413)	34.1 (303/888)
≥ 15 pack-years	74.3 (353/475)	56.2 (232/413)	63.9 (585/888)

*Data are presented as % (No./total participants).

were representative in gender, age, and residency of the Greece national population (p = 0.8).[18]

Smoking Rates

Smoking intensity of ≥ 15 pack-years was reported by 63.9% of the participants. Among men, the majority (74.3%) reported a significant smoking history of ≥ 15 pack-years (Table 1). However, women reported a significantly smaller proportion of smoking history of ≥ 15 pack-years than men (56.2% vs 74.3%, p < 0.0001) [Table 1]. A higher proportion of women (61%) than men (48.4%) were current smokers. The gender differences also existed in terms of mean pack-years. Men were considerably more intense smokers than women: 33.87 ± 44.5 pack-years vs 17.10 ± 20.1 pack-years (mean ± SD; p < 0.0001) [Table 2]. In contrast, a higher proportion of female patients with COPD (65%) were current smokers compared to male patients (45.5%). By community setting, the pattern of smoking intensity was statistically significantly different only among men (Table 2). Specifically, rural male smokers reported a significantly higher smoking history (pack-years) than urban (p = 0.0001) and other-urban smokers (p = 0.001) [Table 2]. The same difference was found between other-urban and semiurban male smokers (p = 0.002), whereas the smoking severity did not differ between rural and semi-urban settings (p = 0.2); smoking intensity did not differ among women according to community setting (p = 0.6) [Table 2].

Table 2—*Mean Pack-years of Smoking History by Gender and Community Setting

Variables	Men (n = 475)	Women (n = 413)	p Value
Overall	33.9 (44.5)	17.10 (20.07)	0.0001
Community setting			
Athens	24.30 (29.3)	17.3 (24.7)	0.0001
Other-urban	33.7 (41.2)	16.3 (17.9)	0.0001
Semiurban	36.8 (35.8)	18.1 (18.5)	0.0001
Rural	41.3 (58.04)	17.03 (17.2)	0.0001

*Data are presented as mean (SD).

Prevalence Rates

Overall, 8.4% of the study participants (75 of 888 subjects) were identified as having COPD. The prevalence among men was 2.5 times higher than in women: 11.6% (55 of 475 subjects) vs 4.8% (20 of 413 subjects) [p = 0.006]. The age-adjusted and gender-adjusted prevalence rates of COPD in the overall study population are shown in Figures 1, 2. Prevalence rates for both men and women were higher in older age groups, approaching 23.7% in men > 70 years of age. In addition, COPD prevalence was higher in each age group for men compared to women. COPD was not common among individuals aged 35 to 49 years (Fig 1).

By community setting (Athens, other-urban, semiurban, or rural), the overall prevalence of COPD ranged from 6.0% in Athens to 10.1% in urban areas other than Athens. Among men, the highest prevalence of COPD (15.1%) was found in rural areas. Among women, urban areas other than Athens had the highest prevalence of COPD (9.0%). The prevalence of COPD was higher among individuals who reported a significant smoking history (≥ 15 pack-years) after age adjustment, compared to those who reported < 15 pack-years of smoking: 10.4% vs 4.6%, p = 0.003 (odds ratio [OR], 2.4; 95% confidence interval [CI], 1.3 to 4.4). This was particularly true in women who had smoked ≥ 15 pack-years, where COPD prevalence was nearly four times higher than in those with a smoking history < 15 pack-years: 7.3% vs 1.7%, p = 0.01 (OR, 4.7; 95% CI, 1.4 to 16.2). The data for male smokers of ≥ 15 pack-years compared to those of < 15 pack-years were 12.5% vs 9%, respectively, p = 0.2 (OR, 1.5; 95% CI, 0.7 to 3.2).

Individuals With COPD

The majority of individuals with COPD were men (73.3%), and nearly 40% were between 40 years and 60 years of age. Over half of those with COPD lived in Athens or other urban areas, while people living in rural areas also comprised a sizeable proportion (32%). Among men, 40% lived in rural areas, while 30% were from urban areas other than Athens. The vast majority

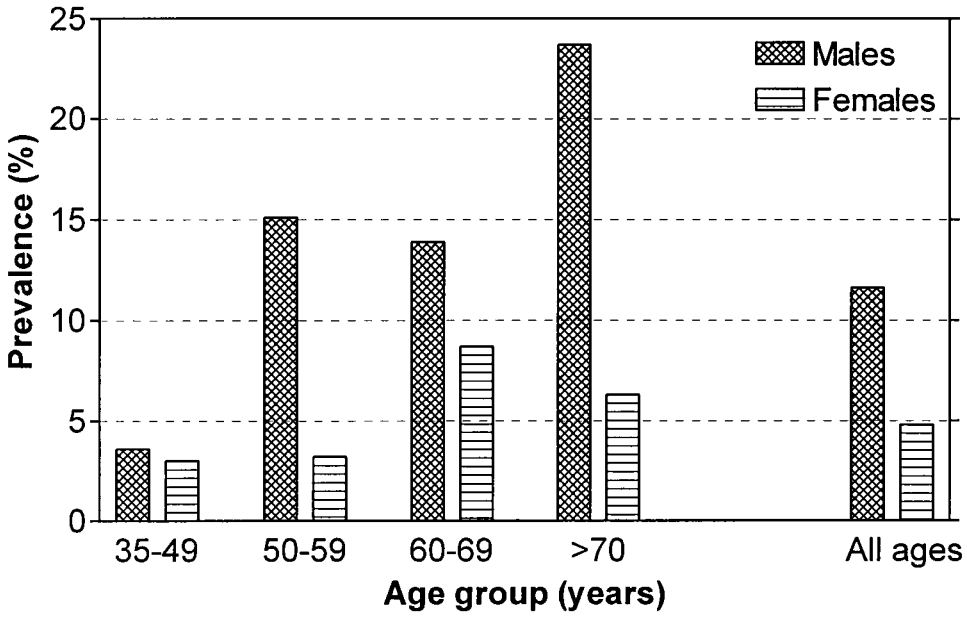

FIGURE 1. Gender-specific prevalence of COPD by age group.

of the patients with COPD (81.3%) reported ≥ 15 pack-years of smoking, both men and women.

Overall, mild COPD was more common than severe COPD, and these patterns were very similar for both men and women (Fig 3); 57.4% of the patients with COPD had mild COPD, 25.3% had moderate COPD, and the remaining 16.0% had severe COPD (Fig 3). In the group with mild COPD, 81.4% did not know that they had the disease.

DISCUSSION

Data Quality

This was the first population-based study of the epidemiology of COPD that has been carried out all over Greece, and it showed that the average prevalence of COPD in the country in people > 35 years old with a smoking history of > 100 cigarettes per lifetime is 8.4%. Two major limitations of surveys

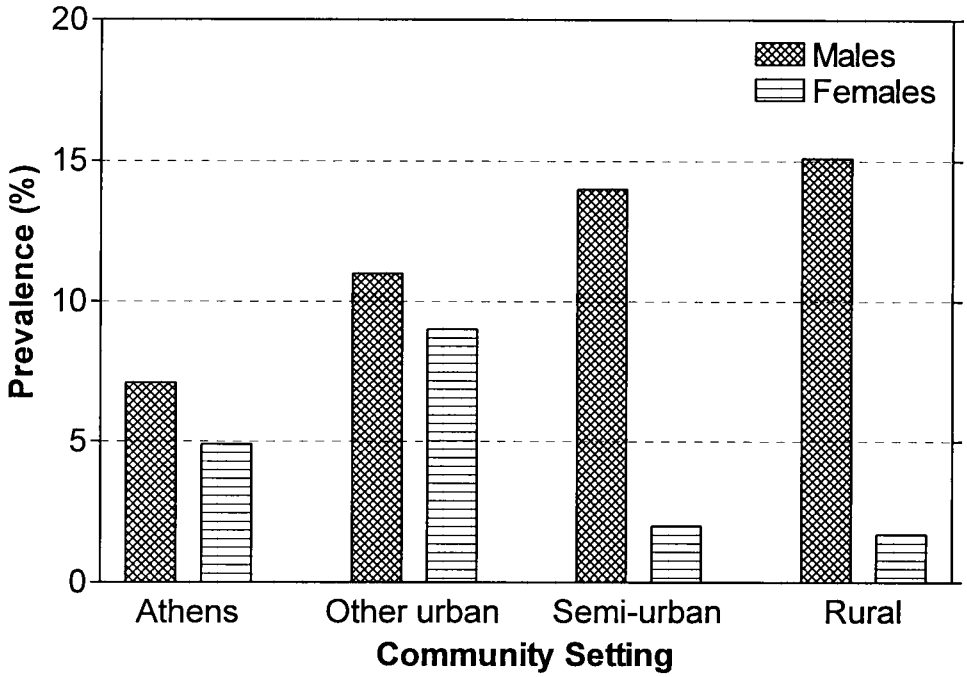

FIGURE 2. Gender-specific prevalence of COPD by community setting.

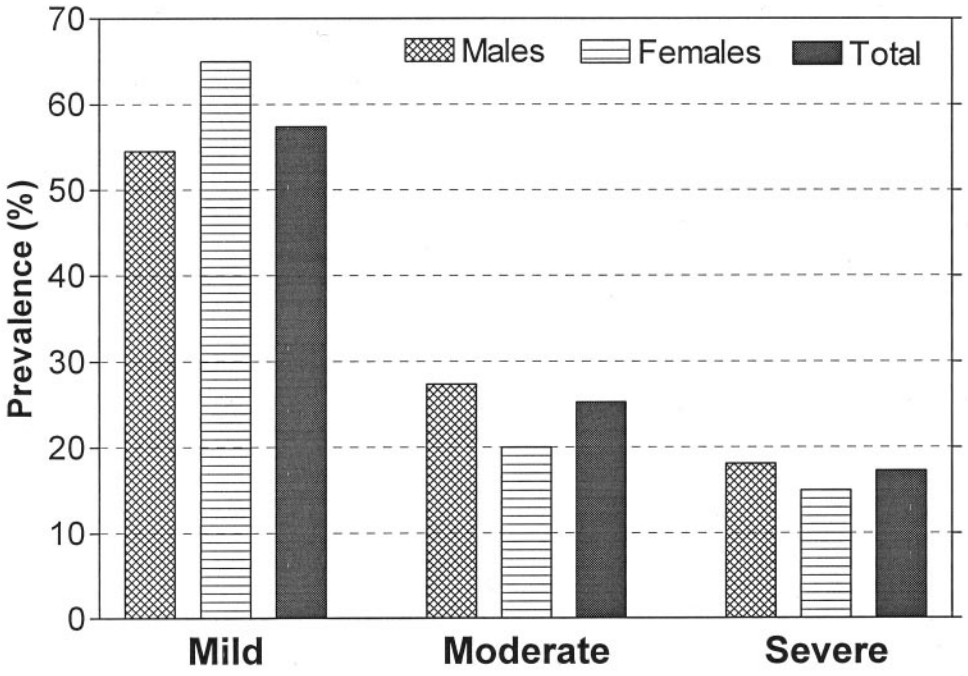

FIGURE 3. Classification of the severity of the disease in men, women, and overall.

dealing with prevalence of COPD in the general population must be considered: the selection of the study population, and the proper definition. We used a population-based design in order to avoid potential selection biases, including the following: variations in accessing health care; frequency and extent of provider contact due to seasonal or year-to-year differences in disease severity; geographic variation; and patient's occupational status. In order to avoid sampling biases, random telephone number lists and municipal rolls were not used to delineate the sampling frame. Individuals ≥ 35 years old were randomly identified, and smokers with a smoking history of at least 5 pack-years per lifetime were recruited. Within each study region or site, individuals were selected to reflect the population structure of the country as a whole; therefore, the final sample was closely representative of the Greek national population (Table 1).

It is well known that few nonsmokers can acquire COPD. They have been excluded from this study because we targeted the vast majority of COPD cases, which were due to smoking. By excluding nonsmoking COPD cases, we had slightly underestimated the total COPD prevalence. However, COPD is a rare condition in nonsmoking Greek adults as it is in other European countries.

A very rigorous diagnostic approach was chosen concerning the identification of the prevalent cases, including a complete clinical evaluation, and spirometry before and after bronchodilation, while individuals presenting with reversibility improvement $> 15\%$ in FEV_1 compared to prebronchodilator FEV_1 were considered as asthmatics and were excluded. In addition, history of atopy or a pattern of disease suggestive of asthma and smoking history < 5 pack-years were also used as exclusion criteria. This relatively strict definition may have resulted in an underestimation of the COPD cases, but it was intended to minimize misclassification of asthmatics as patient with COPD.

Crude Prevalence Rates: National and International Comparisons

The overall prevalence rate in the studied population (adults > 35 years old and smokers of at least 100 cigarettes per lifetime) was 8.4%. It was found that 11.5% of the men and 4.8% of the women had clinically relevant COPD in Greece. The findings of the present study are in accordance with those reported by Gourgoulianis et al,[10] who studied adults aged > 55 years and reported a prevalence of chronic bronchitis of 9.6% in rural areas and 17.1% in industrial areas of central Greece. Moreover, in a secondary data analysis of results from the Seven Countries Study, Tabak et al[11] studied adults > 50 years old and reported COPD prevalence of 15.1%

and 16.3% in two different rural locations in Greece. However, the prevalence of COPD in this study was defined based on patients' responses to a modified version of the British Medical Research Council questionnaire on respiratory symptoms. Finally, Vrachnis and colleagues,[12] who assessed the prevalence of COPD in the municipality of Larissa using spirometry in 364 persons > 55 years old, reported a COPD rate of 15.5%.

Although any comparison between various studies must be interpreted with great caution, the 8.4% rate found in this study is comparable to the 5 to 15% prevalence rate of COPD reported in Europe,[1,4,6–8,19,20] in Japan,[9] and in the United States.[5] In addition, data reported from some countries in the Asia-Pacific area show prevalence rates similar to those in Western populations, and a prevalence of 6.8% has been reported in an elderly Chinese population living in Hong Kong.[21]

The COPD prevalence found in the present study is within the range observed in countries with much lower smoking rates than Greece.[1,4,6,7,19,20,22] This relatively low COPD rate seems odd if it is correlated with the high and continuously increasing percentage of smokers in the Greek population during the last 2 decades. In contrast to most countries in the EU, where the *per capita* consumption has decreased, annual adult (age ≥ 15 years) *per capita* consumption of cigarettes has risen steadily in Greece since the 1970s.[23] In the early 1990s, the *per capita* consumption in Greece was the highest in the EU, averaging approximately 3,600 cigarettes.[14] Thus, in Greece the extremely high prevalence of smoking is not accompanied by a correspondingly high COPD prevalence. The lack of a close correspondence between tobacco consumption and COPD prevalence in Greece is not easily explained and seems to be a medical paradox. This was also noticed in the European Respiratory Society 1995 report, in which Greece was reported to have one of the smallest mortality ratios from the disease among European countries.[17] Although this cross-sectional study was not designed to investigate the discrepancy between high smoking rates and average COPD prevalence, several possible factors could be involved in the Greek COPD paradox, including the following: decreased susceptibility due to genetics[24]; Greek lifestyle, such as diet[11]and outdoor activities; phase difference between smoking exposure and COPD development[13]; and other unknown host/environmental factors.[25] The data of this study are not enough to support this hypothesis, and further longitudinal cohort studies are needed to identify the causes of the Greek paradox of high smoking consumption and lower-than-expected COPD prevalence.

Gender-Specific, Age-Specific, and Community-Specific Prevalence Rates

Consistent with the international epidemiology of COPD,[1,26] Greek men also showed higher prevalence rates than women: 11.6% vs 4.8%, respectively. In our study, the major determinant of this gender variability seems to be the difference in smoking intensity. Men in this study had smoked almost twice as many pack-years as women (Table 2). Additionally, a significantly higher proportion of men than women reported a smoking history of > 15 pack-years (Table 1). Several studies have suggested that women may actually be at higher risk of acquiring COPD, although none of them controlled for potential host and exposure confounders.[1] Prescott et al[27] reported that hospital admission due to smoking-related COPD was higher in women than in men. Additionally, Silverman and colleagues[28] studied two groups of men and women with early-onset severe COPD and their first-degree relatives and reported that current smoker and ex-smoker women with severe early-onset COPD had a significantly greater lung function decline than men. In agreement with the above reports, the separate analysis of male and female populations in this study after age and smoking intensity adjustment revealed that female smokers of ≥ 15 pack-years were more susceptible than men to acquire smoking-related COPD: OR, 4.7 (95% CI, 1.4 to 16.2) vs OR, 1.5 (95% CI, 0.7 to 3.2). However, it is well documented in cross-sectional prevalence studies that male gender comprises a risk factor for COPD, taking into account the higher smoking and occupational exposure of men compared to women.[29,30] Moreover, it has been reported that the smoking effect is more pronounced in men than in women because men often start earlier, smoke more, and have a higher rate of inhalation than women.[31] Thus, the current high COPD prevalence among men observed in this study is in agreement with the past and current trends in smoking behavior. However, the results of the increase in smoking among women are expected to have an effect on COPD prevalence in the near future.[32]

In accordance with the international literature,[1] a significant proportion of individuals diagnosed with COPD (30%) were ≥ 60 years old. The prevalence of the disease in subjects aged ≥ 50 years found in the present study ranged between 10.7% and 15.8%, and is in accordance with the findings of Vrachnis and colleagues,[12] who reported a COPD rate of 15.5% in individuals aged > 55 years in a region in central Greece. In the present study, nearly 40% of individuals with COPD were between 40 years and 60 years old, indicating the importance of the disease

in the working population.[33] Although prevalence rates of COPD in subjects aged 35 to 49 years (3.4%) are obviously smaller than in older individuals (Fig 1), these rates are of interest because they represent a cohort of patients with a long life expectancy and, presumably, a considerable contribution to the burden of the disease.[34] Moreover, the remarkable COPD rates observed in Greek young adults can be targeted by the health authorities and occupational health professionals to promote awareness of the disease.

The present study documents a widespread variation in the prevalence of COPD among the various community settings: Athens, other-urban, semiurban, and rural areas. In men, the prevalence ranged between 7.1% in Athens to 15.1% in rural areas, whereas in women the highest rate (9%) was observed in the other-urban setting and the lowest (1.7%) in rural areas (Fig 2). This controversial observation could be partially explained by the different patterns in smoking habits, and by risk factors other than active smoking contributing differently within each geographic area. The rural male population in this study were heavier smokers than men in Athens (Table 2). Additionally, it is a tradition in rural Greece for men to spend almost the entire afternoon in *kafenia* (coffee houses) where passive smoking is a significant factor. So, the active smokers are passive smokers as well, inhaling heavily polluted room air in *kafenia*. Therefore, it is possible that the combination of the active and passive smoking in the rural male population is the major determinant of the higher COPD prevalence in men, surprising other risk factors such as air pollution or occupational exposure seen in urban areas. In contrast, the female population in this study did not differ in smoking intensity according to community setting (Table 2), and the observed geographic variation in COPD rates in the female population could not be explained by their smoking differences. Other factors besides smoking could be involved in the geographic variation in women, including outdoor and indoor air pollution,[35] occupational exposure,[25] socioeconomic status,[36] climate,[25] and genetic factors.[24] New studies are needed to investigate these geographic differences in order to provide new insights into the epidemiology and pathogenesis of COPD in Greece.

The severity of COPD was reported as mild, moderate, or severe according to the European Respiratory Society statement classification scale.[17] Among all individuals with a diagnosis of COPD in the present study, 57.3% had mild disease. In accordance with the international prevalence studies,[1] overall, mild COPD in the present study was more common than the advanced disease, and these patterns were very similar for both genders. This proportion refers to individuals with no symptoms, the vast majority of whom had never received medical advice. During this asymptomatic period, patients are unaware of their disease and usually continue to be exposed to smoking, to high-risk occupations, and other risk factors.[37] The results are also consistent with both underdiagnosis and presumably undertreatment of the COPD population, since 81.4% of these patients had never sought medical advice for their disease.[38] This is a challenge for the Greek health-care system to apply an efficient strategy in order to identify, protect, and treat those patients with mild COPD.[39]

In conclusion, this is a direct cross-sectional study investigating COPD prevalence in a random, nationally representative sample of the general population, using objective lung function measurements in addition to clinical criteria. The results indicate that the prevalence rate of the COPD in Greece is substantial, although this is not well correlated with the national smoking figures, which are among the highest worldwide. This discrepancy is a challenge for further studies aiming to provide information about the possible "protective factors." The specific to age-distribution, gender-distribution, and geographic-distribution rates showed an interesting variation, explained mostly by the differences in smoking patterns. The analysis of COPD individuals showed that a significant proportion of them is in the mild stage of the disease and has never sought medical advice. This observation emphasizes the need for the Greek health-care system to identify this "silent" cohort of patient with COPD in order to prevent progression of the disease.

Appendix 1

This is a collaborative work of the COPD group of the Hellenic Thoracic Society: Chrysofakis G, Dimakou A, Dimitroulis J, Dimopoulou S, Drakos G, Flevari A, Gerogianni A, Gourgoulianis K, Kakavelas P, Kakoura M, Katsoudas E, Konstantopoulos S, Kosmas E, Koumpa E, Koumpaniou X, Kritikos D, Krokidis A, Markoulis N, Massaras H, Mauropanou D, Mpousmoukilia S, Palama E, Panagopoulos Z, Papalexatos D, Pataka-Argiropoulou P, Raptis X, Samiou M, Staurou E, Taktikou E, Tsarouxa A, Tsiokou I, Tzortzi A, Vranaki M, Xatzigianis M, Zakesti S, Ziogas E.

Appendix 2

Cities, Towns, and Communities Surveyed

Urban Population

Athens (Patisia, Plaka, Moshato, Marousi, Nea Smirni, Liosia); Thesaloniki (Stratou, Palia Poli, N. Eukarpia); Patra; Larissa; Ioannina; Kavala; Heraklion; Katerini; Mitilini; Rhodes.

Semiurban (Perfecture)

Rion (Ahaia); Kato Ahaia (Ahaia); Mires (Heraklion); Arkalohori (Heraklion); Ambelonas (Larissa); Agia (Larissa); Anatoli (Ioannina); Konitsa (Ioannina); Hrisoupoli (Kavala); Spata (Attiki); Loutsa (Attiki); Oreokastro (Thessaloniki); Litohoro (Pieria); Ialisos (Dodekanissa); Agaisson (Lesbos).

Rural (Prefecture)

Agios Vasilios (Ahaia); Egira (Ahaia); Makrihori (Larissa); Damasi (Larissa); Mohos (Heraklion); Dafnes (Heraklion); Kato Ascites (Heraklion); Koutselio (Ioannina); Pedini (Ioannina); Nea Karia (Kavala); Krioneri (Attiki); Grammatiko (Attiki); Trilofo (Thessaloniki); Asvestohori (Thessaloniki); Nea Efessos (Pieria); Sfendami (Pieria); Appolona (Dodekanisa); Mandamados (Lesbos).

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