

# Sample Survey of Chronic Obstructive Pulmonary Disease and Associated Risk Factors in Isfahan, Iran

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## ABSTRACT

**Background:** The purpose of this cross-sectional study was to estimate the number of individuals with chronic bronchitis and/or chronic obstructive pulmonary disease in Isfahan. Our study results were compared with those of previous studies in Iran and similar studies in other countries.

**Materials and Methods:** As a part of a population-based, cross-sectional study, 2,200 randomly selected individuals aged 40 years or older were asked to take part in the survey; among whom, 1308 individuals (59.45%) agreed to fill out the respiratory questionnaire. This group consisted of 636 (48.6%) males and 672 (51.4%) females.

Spirometric measurements were performed in 279 cases. COPD was defined by the "Global Initiative for Obstructive Lung Disease" criteria.

**Results:** One hundred-seven individuals (8.1%) fulfilled the clinical criteria for chronic bronchitis as the main sign of COPD. Multivariate analysis revealed that age and smoking were independent predictors for chronic obstructive pulmonary disease.

**Conclusion:** It is concluded that the prevalence of chronic bronchitis symptoms is approximately the same in our population as compared with western countries. The frequency of clinical chronic bronchitis has risen in comparison to a previous study in Isfahan. (Tanaffos2011; 10(3): 32-36)

**Key words:** Chronic obstructive pulmonary disease, Epidemiology, Prevalence, Iran, Isfahan

## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is the fourth major killer disease in the United States (1), and most of the developed countries (2). This condition is a leading cause of mortality and

morbidity all over the world (1,3,4). It also contributes to a great economic burden imposed on the communities (1,4).

Research work regarding various aspects of COPD is greatly encouraged by academic institutions, both for its high prevalence in the world (5) and because it is potentially preventable (6) by smoking cessation, and air pollution control.

Cigarette smoking has been identified as the main

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cause of this disease and many successful attempts have been carried out to inform the population about the risks associated with this behavior. These warnings have resulted in significant changes in the pattern of cigarette smoking in most developed populations, with resultant changes in disease frequency in many communities (7). These changes include decreased number of smoker men and a paradoxical rise in number of smoker women during the past few decades.

Smoking pattern in Iran is far more different from other parts of the world. In fact, in our community smoker women comprise less than five percent of the population (8). However, the reported frequency of COPD among Iranian women is not lower than other parts of the world. Therefore, we should look for causes other than smoking for this condition (9,10). Unfortunately, limitation of research grants confines in-depth works to clarify the problem.

A few epidemiologic studies have been published regarding the prevalence of COPD in Isfahan since 10 years ago (10, 11).

Stressing the seriousness of this condition by reevaluation of previous findings can draw the attention of organizations in charge to promote more efforts in this field.

This study aimed to evaluate the prevalence of chronic bronchitis and/or COPD in Isfahan and assess the changes in the previous decade.

## MATERIALS AND METHODS

The ethical committee of the Isfahan University of Medical Sciences approved this research project.

As a part of Isfahan respiratory epidemiologic survey, we planned to evaluate the prevalence of chronic bronchitis and/or COPD as defined by the global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary

disease (12).

The questionnaire contained questions regarding demographic and occupational details, respiratory symptoms and smoking. The questions were based on the "European Compendium of Respiratory Standard" (13).

Persian translation of the questionnaire for adults was used for discrimination of suspected COPD cases. The translated version of the questionnaire was back-translated to English by a different individual not involved in the study, to ensure that the spirit of the questionnaire is intact.

For the purpose of randomization, the map of Isfahan was divided into 100 geographic areas, after which one lane from each area was selected by drawing lots. Trained interviewers went to the selected lanes, knocked all the doors of the residential places and asked the residents to answer the questions. Those people who agreed to take part, and signed a written consent were enrolled in the study. Then the interviewer filled out the questionnaire at the presence of subjects.

If some residents were not accessible in the first session, the interviewer had to stop by several times to make the interview or to ensure that the place is not currently in use. A few places used for jobs were excluded from the study.

The completed questionnaires were reviewed by one pulmonologist, and subjects who admitted to have chronic productive cough for at least three months a year in two successive years were asked to perform pulmonary function tests (PFT) and impulse oscillometry to determine if they also have developed obstructive phase of the illness.

The measurement of respiratory impedance by IOS was done with a commercially available oscillatory system (MS-IOS; Masterlab-IOS, Erich Jaeger, Germany), all spirometric measurements

were conducted by one technician, the details of which have been described elsewhere (14), and fulfilled standard recommendations (15).

Subjects with an obstructive pattern of PFT were retested for 10 minutes after administration of 2 puffs of salbutamol by metered dose inhaler (MDI) to evaluate the reversibility of the obstruction. Meanwhile a sex and age matched group of asymptomatics were also asked to perform PFT and impulse oscillometry in the same described manner to further reassure the reliability of the responses to questionnaires.

A cut-off point of occupational exposure to dusts/gases/fumes for 1 yr classified the subjects into two groups (yes or no) (16).

The obtained data were collected in a database to be analyzed by using SPSS version 18 software.

We used data from people aged 40 or more to be comparable to more recent international reports (3).

Frequency tables were used to extract demographic characteristics of the population.

Cross-table test was used to determine the association between clinical and spirometric findings between the two groups with and without COPD.

Multi-nominal regression analysis was used to evaluate the correlation between chronic bronchitis and possible risk factors.

Nonsmoker individuals living with smoker relatives were considered as passive smokers.

## RESULTS

In the initial phase, 1,308 subjects out of 2,200 eligible people (59.4%) agreed to take part in the study. The enrolled population consisted of 672 women and 636 men, with an age range of 40 to 94 years.

Unfortunately, response to the second phase was not brilliant. Overall, 279 individuals including 62 symptomatic and 217 asymptomatic cases took part

in the study.

Demographic characteristics of the population including BMI, active and/or passive smoking habits and occupational risk categories are summarized in Table 1.

Table 2 presents the frequency of self reported respiratory symptoms including chronic bronchitis as defined above.

Table 1. Distribution of demographic and anthropometric characteristics, smoking pattern and level of education

Specificities	Males	Females
Age (Mean±SD) years	56.35±9.50	59.37±10.43
<b>Age categories</b>		
40-49 years	119(18.7%)	192(28.4%)
50-59 years	236(37.2%)	253(37.6%)
60 & higher	280(44.1%)	228(33.9%)
<b>BMI</b>		
Normal weight (BMI 25 or less)	25.68± 3.92	27.46±4.92
Over weight ( BMI >25<30)	300(47.2%)	200(29.8%)
Obese (BMI >30)	252(39.6%)	298(44.3%)
Ever smoker	84(13.2%)	174(25.9%)
<b>Education</b>		
Junior high-school or lower	141(22.2%)	3(0.4%)
High school	344(54.1%)	484(72%)
University	219(34.4%)	159(23.7%)
University	73(11.5%)	29(4.3%)
<b>Total number (1308)</b>	<b>636 (48.6%)</b>	<b>672 (51.4%)</b>

Table 2. Self -reported symptoms

Variable	Male	Female	P value
Chronic morning cough	109(17.1%)	52(7.7%)	0.000
Chronic cough during the day	87(13.7%)	45(6.7%)	0.000
Chronic bronchitis by classic clinical definition	81(12.7%)	26(3.9%)	0.000

Table 3 shows the comparisons of the spirometric findings in the symptomatic versus the asymptomatic groups.

Table 4 shows the relationships between chronic bronchitis and/or COPD and various risk factors.

There was a significant reverse correlation between smoking and age in our understudy subjects.

**Table 3.** Characteristics of those undergoing pulmonary function test and impulse oscillometry

	With clinical COPD	Without clinical COPD	P value
Total number	62	217	
Mean FVC(liters)	3.08±1.07	3.61±1.06	0.00
Mean FVC post- bronchodilator(liters)	3.09±1.03	3.68±1.06	0.00
Mean FEV1(liters)	2.36±0.88	2.99±0.93	0.00
MeanFEV1 post- bronchodilator(liters)	2.42±0.84	3.11±0.95	0.00
Mean FEV1/FVC	78.55±10.17	83.54±9.61	0.00
Mean FEV1/FVC post- bronchodilator	76.49±14.01	85.30±10.25	0.00
R5	0.51±0.36	0.47±0.33	0.35
R5 post-bronchodilator	0.48±0.31	0.42±0.25	0.18
R25	0.39±0.32	0.34±0.19	0.23
R25 post-bronchodilator	0.33±0.18	0.32±0.25	0.93
Zbi	0.54±0.36	0.50±0.36	0.46
Zbi post-bronchodilator	0.53±0.34	0.47±0.38	0.39

**Table 4.** Predictors of COPD (FEV1<80% predicted and FEV1/FVC<0.7) against potential explanatory variables.

Variables	Number(%)	Odds ratio (95% CI)	P value
<b>Age- categories</b>			
40-49 years	311(23.7)	0.29(0.11-0.70)	
50-59 years	489(37.4)	0.23(0.10-0.51)	
60 years and over	508(38.9)	1	<0.001
<b>BMI</b>			
Normal	500(38.3)	0.60(0.27-1.33)	
Overweight	549(42)	0.76(0.35-1.65)	
Obese	258(19.7)	1	0.45
<b>Smoking</b>			
Smoker	144(11)	1.17(0.29-4.72)	
Nonsmoker	1136(88.9)	0.24(0.06-0.89)	
Exsmoker	27(2.1)	1	<0.001
Passive smoker	171(13)	1.15(0.43-3.08)	0.77
No smoker at home	1136(86.9)	1	
<b>Education</b>			
Junior high-school /lower	827(63.3)	0.55(0.19-1.54)	
High school	378(28.9)	0.33(0.10-1.09)	0.19
University	102(7.8)	1	

Multivariate logistic regression analysis: P<0.05 was considered as a cutoff point for significance

## DISCUSSION

Since there are only a few available epidemiological studies on the prevalence of COPD

in Iran (9-11), a true comparison between various parts of the country is not possible. Furthermore, follow-up studies have never been published.

Cross-sectional epidemiologic studies are valuable tools to evaluate the overall situation of the disorders which is necessary for health care providers to adjust their priority in using evaluation methods when facing symptoms referring to multiple disorders, and also these information are necessary for community health programmers to provide adequate facilities, health care programs, and research opportunities to find the important etiologic factors, and in order to try to control the situation.

Repeated studies in certain intervals can elucidate the efficacy of preventive measures applied during the interval.

To the best of our knowledge, this is the first interval study performed in Iran regarding the prevalence of COPD. According to such comparisons, the prevalence of chronic bronchitis as the first/main sign of COPD increased significantly in Isfahan during 1999-2010. The methodology of the two has been the same, but we had a five year older population in the new series which might have minimal effects on the increased frequency of COPD, however the almost two-fold increment can not be explained by this five year age difference.

An earlier published study in Isfahan in 1999 showed the frequency of chronic bronchitis in Isfahan to be 6.85% and 3.1% in men and women respectively. In the current study, the frequencies raised to 12.7% in men and 3.9% in females. This increase might be more alarming when we notice that the prevalence of smoking among Isfahan male residents not only did not increase during the past 10 years (8-11), but also showed a minimal decrement (25.3% current smokers in 1999 versus 22.2% ever smokers in the current study), a fact which implies that anti-smoking warnings provided by health care workers and global mass media have been effective and are approaching the ideal goals. However, other factors including increased air pollution both from traffic sources and industries and poor job conditions

are also possible extra contributors to the problem.

Increasing age is a known risk factor for COPD. In fact the older a person gets, the greater the chance of continued exposure to smoke and air pollutants.

Unfortunately, occupation as a risk factor for respiratory illnesses in men in Isfahan has always been a difficult matter of discussion, since most people do not declare their accurate job, for fear of a possible tax increment and furthermore, many people have multiple jobs with different respiratory risks, while they only declare their official job, and ignore the others. Therefore, the risk estimation of job exposures was not elucidative in our study.

We have to increase the awareness about COPD and its related risk factors in our population. Also, the negative trend observed in this survey must be further evaluated in future studies.

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