Prevalence of Chronic Obstructive Pulmonary Disease in Korea: The Result of Forth Korean National Health and Nutrition Examination Survey

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Background: Chronic obstructive pulmonary disease (COPD) is a major cause of chronic morbidity and mortality throughout the world and is the only major disease that is continuing to increase in both prevalence and mortality. The second Korean National Health and Nutrition Survey revealed that the prevalence of COPD in Korean subjects aged ≥45 years was 17.2% in 2001. Further surveys on the prevalence of COPD were not available until 2007. Here, we report the prevalence of spirometrically detected COPD in Korea, using data from the fourth Korean National Health and Nutrition Survey (KNHANES IV) which was conducted in 2007~2009.

Methods: Based on the Korean Statistical Office census that used nationwide stratified random sampling, 10,523 subjects aged ≥40 years underwent spirometry. Place of residence, levels of education, income, and smoking status, as well as other results from a COPD survey questionnaire were also assessed.

Results: The prevalence of COPD (defined as forced expiratory volume in 1 sec/forced vital capacity <0.7 in subjects aged ≥40 years) was 12.9% (men, 18.7%; women, 7.5%). In total, 96.5% of patients with COPD had mild-to-moderate disease; only 2.5% had been diagnosed by physicians, and only 1.7% had been treated. The independent risk factors for COPD were smoking, advanced age, and male gender.

Conclusion: The prevalence of COPD was 12.9% in the KNHANES IV data. Most patients with COPD were undiagnosed and untreated. Based on these results, a strategy for early COPD intervention is warranted in high risk subjects.

Key Words: Pulmonary Disease, Chronic Obstructive; Korea; Prevalence; Spirometry; survey

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Introduction

Chronic obstructive pulmonary disease (COPD) is a major disease which is continuing to increase in prevalence and mortality rate, worldwide. In Korea, COPD ranked 6th among the causes of death in 2008. Moreover, the hospitalization cost associated with COPD increased from 111 billion won in 2004 to 266 billion won in 2008. Therefore, COPD imposes a great burden on the public health.

The worldwide prevalence of COPD has been estimated to be 7.5∼10%. In a nationwide COPD prevalence survey in Korea in conjunction with the second South Korean National Health and Nutrition Examination Survey (Korean NHANES II) conducted 2001, 17.2% of Korean adults over the age of 45 years had COPD. However, there was no follow-up survey until 2007. The Korean Academy of Tuberculosis and Respiratory Diseases and the Korea Center for Disease Control and Prevention conducted a survey on national health and nutrition, including assessment of COPD prevalence, beginning in 2007. Here, we report on the prevalence of COPD in Korea, using data from the fourth Korean National Health and Nutrition Examination Survey (KNHANES IV).

Materials and Methods

1. Subjects

Unlike previous surveys as short-term ones for 2∼3 months at an interval of three years, KNHANES IV (2007∼2009) was performed as a survey all year around. The KNHANES IV used rolling sampling survey method for the sample in each year to present the whole nation and to be similar by years.

KNHANES IV investigated 4,600 households from 200 enumeration districts per year (23 households per enumeration district) with the data of Population and Housing Census conducted by Statistics Korea as a tool for sampling. Enumeration districts were obtained by classifying the whole nation into 11 regions (seven metropolitan cities; Gyeonggi, Gyeongsang/Gangwon, Chungcheong, Jeolla/Jeju) and they were stratified into 29 regional layers by considering the population composition by age in Dong, Eup and Myeon of each region. After allocating the number of Dong, Eup and Myeon in proportion to the number of enumeration districts of the population in each layer, 200 Dong, Eup and Myeon were selected in total. By reflecting characteristics of the selected Dong, Eup and Myeon by housing types, enumeration districts were extracted one by one and 23 households were done from one enumeration district through systematic sampling.

The survey was conducted in four enumeration districts every week or in 200 enumeration districts every year. The eligible subjects of KNHANES were persons aged over one year, Spirometry was performed for the subjects aged over 19 years.

2. Spirometry

Spirometry was conducted with Dry Rolling-seal spirometry (Vmax series Sensor Medics 2130; Sensor Medics, Anaheim, CA, USA) by specially trained technicians who conformed to pulmonary function test (PFT) guideline of American Thoracic Society and European Respiratory Society. We used the prediction equation derived from the KNHANES II.

The results of spirometry in each enumeration districts were transmitted to the central quality control center through the Internet to investigate whether the results satisfied acceptability and reproducibility criteria of spirometry for quality control and quality assurance. The results finally confirmed by the principal investigator were stored in the data management system of Korea Centers for Disease Control and Prevention (KCDC).

3. Questionnaire for COPD

Trained interviewers administered questionnaire about COPD at the time of spirometry. The questionnaire included questions about whether to have history of COPD, whether to be diagnosed by a physician, whether to be currently treated and whether to utilize currently medical service.