

Smoking cessation and chronic obstructive pulmonary disease

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See Article on Page 191-197

As the populations of many countries age, the prevalence of chronic obstructive pulmonary disease (COPD) is expected to rise proportionately, which will impose a tremendous social and economic burden on society in terms of morbidity and mortality. In 2008, the prevalence of COPD, as determined based on a pulmonary function test, among Korean adults aged 40 and over was 13.4%. According to the Korea National Health and Nutrition Examination Survey, this corresponds to an estimated prevalence of 3.2 million cases in the Korean population [1]. The prevalence of COPD in Korean adult males aged 40 and over is 19.4%; thus, one out of every five Korean men in this age group has COPD, although the rate of diagnosis and treatment is very low, approximately 2.4%.

A study of COPD costs by the Health Insurance Review and Assessment Service (HIRA) found that approximately 35% of COPD patients are admitted more than once a year for acute exacerbation and 20% visit the emergency room. Healthcare expenditures for COPD in Korea have steadily risen such that in 2010, the total medical expenditure per COPD patient was approximately 3 million Korean won (KRW) and total insurance-covered medical costs for all COPD patients

was 640 billion KRW [2]. Thus, the socioeconomic burden of COPD is significant.

Patients with symptomatic COPD are typically treated with inhaled long-acting bronchodilators (LABAs) unless otherwise indicated. Although LABAs are regarded as the mainstay of COPD treatment, many patients receive oral medications instead. The under-prescription of LABAs highlights the need for guidelines and their correct implementation so as to offer COPD patients optimal care. For example, patients treated with inhaled short-acting bronchodilators as monotherapy have 4.3-fold more visits to the emergency room (ER), a 5-fold higher rate of admissions, and 4.5-fold higher healthcare costs than patients treated with LABAs. In patients with severe COPD, acute exacerbations result in a greater number of admissions, ER visits, and total health costs than is the case in patients with mild COPD [3,4].

COPD is an incurable disease that progressively impairs pulmonary function. The worsening of symptoms leads to physical inactivity and eventually death. The most economical and effective way to prevent COPD progression is the cessation of smoking, which reduces the risk of developing COPD and respiratory symptoms, hospitalization due to acute exacerbations, and the annual

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decline in forced expiratory volume in 1 second. Indeed, smoking cessation is the most important strategy in preventing COPD and in reducing COPD-related mortality. Therefore, in patients at risk, an active educational program regarding smoking cessation and its positive effects on COPD prevention and symptom amelioration is a critical aspect of COPD patient management. In a study conducted in a primary care setting, the smoking cessation rate doubled when patients were informed of their lung age based on the results of spirometry [5]. Since pulmonary function tests are not commonly used in the primary care setting in Korea, spirometry has become an effective tool in the early detection of COPD and in 2014 was included by HIRA in its list of COPD quality assessment methods.

In Korea, the percentage of individuals over the age of 15 years who smoke is 23.2%, which is higher than the average rate of 20% in Organisation for Economic Co-operation and Development (OECD) countries, with the exceptions of France, Italy, Turkey, and Spain, where smoking rates are roughly the same as in Korea. Also, 41.6% of Korean males are smokers, which is substantially higher than the average of 25.7% in OECD countries. However, only 5.1% of Korean females are smokers, compared to the OECD average of 16.3% [6]. Therefore, smoking cessation efforts should mainly target Korean males but should also be effective in reaching smaller segments of the smoking population, in particular the young, females, and low-income individuals.

In Korea, a national smoking cessation policy was implemented in 1995 as part of the law aimed at promoting national health. Beginning in 1998, the National Health Fund instituted several policies such as placing "sales prohibited to youth" labels on cigarette packages (Juvenile Protection Act, 2001), promoting a public campaign for the cessation of smoking, mandating the disclosure of cigarette-released substances (Tobacco Business Act, 2002), expanding smoke-free areas by restricting smoking in indoor places such as large restaurants and internet cafes, and increasing cigarette prices (2004). In 2003, the Framework Convention on Tobacco Control (FCTC) was unanimously adopted by the World Health Organization. The Republic of Korea signed the FCTC on 21 July 2003 and ratified it in May 2005. The expanded efforts of the Korean government

included the establishment of public health clinics and quitline services to aid in the cessation of smoking, the expansion of smoke-free areas to industries in 2006, and the launching of a public anti-smoking campaign in 2007 [7]. The Ministry of Health and Welfare allocated approximately 10 billion KRW in 2012 and 8.9 billion KRW in 2013 to promote smoking cessation. However, most smoking cessation programs are conducted by public health centers, a fact that limits their utility for COPD patients, who are diagnosed and treated in hospitals but who must be transferred to public health clinics if they are to receive government support in their efforts to quit smoking. Consequently, the number of patients who visit public health centers is relatively low. Educating patients on smoking-related diseases such as COPD could increase the rate of smoking cessation, but education programs are not part of the treatment program at public health clinics. Thus, increased medical and political steps must be taken to develop integrated policies that include patient education and whose impact in terms of efficacy is determined by regular quality assessment monitoring.

Many industrialized countries have implemented anti-smoking policies. In the United States, 19.3% of adult males (45.3 million people) are smokers and 17.3% of females. Smoking rates are highest among those 25 to 44 years (22.0%) and 45 to 64 years (21.1%) of age. Combined medical costs and losses in productivity were US dollar 289 to 332.5 billion in 2009 [8]. The National Tobacco Control Program (NTCP, 1999), administered by the Office on Smoking and Health under the auspices of the Centers for Disease Control, includes anti-smoking policies and programs. The NTCP is a national-government-scale endeavor to reduce smoking-related diseases and mortality in the United States, with state governments providing financial and technical support. The objectives of the NTCP are: (1) remove exposure to secondhand smoke; (2) promote quitting among adults and young people; (3) prevent the initiation of smoking by young people; and (4) identify and eliminate disparities in anti-smoking efforts among population groups. The smoking rate in the UK has been declining steadily since 2000. Smoking rates among British males and females in 2009 were 22.3% and 20.7%, respectively [9]. The Medical Council participated in the initiation of a smoking cessation campaign in 1984; increased the

cost of cigarettes in early 1990; developed a government policy on smoking cessation and treatment guidelines for smokers, both in 1998; offered national support for the treatment of patients with smoking dependency, in 2000; and prohibited cigarette advertisements in 2003.

As demonstrated in several studies, a willingness to stop smoking and the appropriate use of anti-smoking medications are the most effective factors leading to smoking cessation. However, the effect of COPD awareness on smoking cessation is unclear. Given that the cessation of smoking is the most important method to prevent COPD or delay its progression, the publication by Mun et al. [10] provided very important information. In a survey conducted by the authors, less than half of adult smokers over the age of 45 who had smoked for more than 10 years felt that they were in a good health, and > 60% of the responders had respiratory symptoms, which in half the cases were untreated while only 14% had visited a hospital. COPD will develop in > 50% of smokers who have smoked for at least 10 years but very few of these individuals will visit a hospital for treatment. The early detection of COPD and the initiation of smoking cessation and concomitant treatment, including the use of medication when necessary, are the best management strategies for COPD patients, but compliance is poor. Educational programs supported by national and local healthcare councils can raise COPD prevention and treatment awareness by emphasizing the importance of visiting a hospital at the early stage of the disease.

Recently, the society of Korean Academy of Tuberculosis and Respiratory Diseases (KATRD) focused on educating COPD patients, their caregivers, and their primary care physicians. Most COPD patients will learn about COPD via television and only 18% will receive the necessary information on COPD from their physicians. Thus, KATRD's efforts to raise COPD disease awareness are not enough to increase national awareness. Among survey responders who attended COPD prevention programs, about half decided to quit smoking based on the information they received in the educational session. This finding highlights the important impact of disease awareness activities and educational programs supporting the cessation of smoking. Furthermore, responders who had previously been informed about COPD but then received addi-

tional information showed greater willingness to quit smoking.

This study was the first to investigate COPD awareness among active smokers in Korea. The results provide further evidence of the importance of patient-oriented education materials and the availability of activities aimed at disease prevention and supporting smoking cessation. In the treatment of COPD, patients should be stratified according to disease severity and factors such as awareness level, smoking quantity, educational and social status, and age of participants. Educational programs on smoking cessation that are tailored to the different smoking populations will improve the success rate.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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