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# Smoking in elderly Koreans: Prevalence and factors associated with smoking cessation

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ABSTRACT

The aims of this study were to investigate the prevalence of smoking and to explore the factors associated with smoking cessation. 1118 Koreans were randomly sampled from the residents aged 65 years or older living in Seongnam, Korea. Structured face-to-face interviews with neurological and physical examinations were conducted to the 714 respondents. A current smoker was defined as a person who had been smoking at least one cigarette per day for 1 year, and a past smoker as a person who used to smoke but had not smoked in the past 1 year. Nicotine dependence was defined as having the Fagerström Test for Nicotine Dependence (FTND) score of 4 or higher. Age- and gender-standardized prevalence of ever smoker, past smoker and current smoker among the elderly Koreans aged 65 and over were estimated to be 36.3% (95% CI = 32.7–39.8), 24.4% (95% CI = 21.2–27.5) and 11.9% (95% CI = 9.5–14.3), respectively. Current smokers were much more prevalent in men (23.3%) than in women (3.9%), but did not decline with advancing age in both genders. 36.0% (21 men, 10 women) of the current smokers were nicotine-dependent. The smokers with depression or alcohol use disorder (AUD) were less likely and those who were educated more or inhaled smoke more deeply were more likely to quit smoking. Thus, smoking is common in the elderly men, and treatments of depression and AUD may be helpful in increasing smoking cessation rate among elderly Koreans.



## 1. Introduction

According to the World Health Organization (WHO) report, there are 1.3 billion smokers in the world and smoking is responsible for approximately five million deaths worldwide every year (World Health Organization, 2009). Smoking causes or aggravates various diseases such as cancers and heart diseases. In Korea, although the public health concerns and government's supports on smoking cessation have been growing, smoking related deaths keep increasing every year (Lee et al., 2010).

According to the report released by the Ministry of Health and Welfare in Korea, the total smoking rate of adults over 19 was 27.2% in 2009, but the smoking rate for Korean males was 46.9%, which is still one of the highest among the Organization for Economic Cooperation and Development (OECD) countries (Korea Centers for Disease Control & Prevention, 2009). According to this report, the smoking rate in the elderly Koreans aged 65 years or older was 14.0%, and 42.8% of the current smokers had attempted to quit smoking in their lives and 25.5% of them had plans to quit smoking.

In quitting smoking, various factors, such as age, sex, education, occupation, economic states, social relationships, smoking characteristics, psychological distress, comorbid physical or mental diseases are known to play independently or interactively (Duncan, Cummings, Hudes, Zahnd, & Coates, 1992; Husten et al., 1997; Hymowitz et al., 1997; Kaplan, Newsom, & McFarland, 2002; Lam et al., 2002; Sherman, Wang, & Nguyen, 1996; Williams,

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Lewis-Jack, Johnson, & Adams-Campbell, 2001). Particularly, the association of smoking with mental disorders such as AUDs and depressive disorders has been repeatedly reported in many epidemiological studies (Breslau, Kilbey, & Andreski, 1991; Duncan et al., 1992; Glassman et al., 1990; Hymowitz et al., 1997; Kendler et al., 1993; Kim et al., 2009).

Smoking behaviors may change with advancing age. It may be more difficult to quit smoking for old people than for young adults because smoking may be a longstanding habit for old smokers or nicotine dependence may be more severe in old smokers compared to young smokers. The motivation to quit smoking may be also different between old people and young adults. For example, health related problems may be more likely to be a motivation to quit smoking in the elderly (Abdullah et al., 2008; Parry, Fowkes, & Thomson, 2001; Salive et al., 1992). These potential differences, in turn, may require different approaches to support smoking cessation for old smokers from young smokers.

In the present study, we investigated the prevalence of smoking and explored the factors associated with smoking cessation in an elderly Korean population.

## 2. Subjects and methods

### 2.1. Subject

This study was a part of the Korean Longitudinal Study on Health and Aging (KLoSHA) (Park, Lim, & Lim, 2007) conducted on residents of Seongnam, Korea who were aged 65 or older between September 2005 and August 2006. Seongnam, one of the largest suburbs of Seoul, had a total population of 931,019 in 2005. Out of the total population, 61,730 (6.6%) were aged 65 or older. A simple random sample ($N = 1118$) by random number generation of statistical software was drawn from the roster of 61,730 elderly individuals who were residents of Seongnam on August 1, 2005. These subjects were invited to participate in the study by letter and telephone. The mean age of the subjects was $72.2 \pm 6.6$ years (range 64–99 years) and 713 (63.8%) of the subjects were women. All subjects were Koreans. All of the subjects were fully informed of the study protocol and provided written statements of informed consent that were signed by themselves or their legal guardians. No compensation was provided to the participants.

### 2.2. Methods

#### 2.2.1. Assessments

We evaluated smoking behavior such as starting age, length (years), amount (cigarettes per day) and level of inhalation (not inhale the smoke, inhale the smoke lightly, moderately, deeply) using a structured questionnaire. To estimate the amount of smoking, we calculated pack-year retrospectively by multiplying the number of packs of cigarettes smoked per day by the number of years the person has smoked. We also evaluated the nicotine dependence of current smokers using the FTND (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991).

Research neuropsychiatrists administered standardized face-to-face clinical interviews, and neurological/physical examinations to all subjects using the Korean version of Mini International Neuropsychiatric Interview (MINI) (Youu, Namkoong, & Kim, 2006) and the Korean version of the CERAD Clinical Assessment Battery (CERAD-K) (Lee et al., 2002). We evaluated the severity of depressive symptoms using were evaluated using Research neuropsychologists administered the Revised Korean version of the Geriatric Depression Scale (GDS-KR) (Kim et al., 2008), and cognitive functions using the CERAD-K neuropsychological assessment battery (Lee et al., 2004). We evaluated the burden of comorbid medical conditions using the Cumulative Illness Rating Scale (CIRS) (Linn, Linn, & Gurel, 1968).

All assessments were performed at the Seoul National University Bundang Hospital (SNUBH). The respondents who could not visit the SNUBH took all the assessments at their homes except the body fat analysis and radiological examinations. The study protocol was approved by the Institutional Review Board of SNUBH.

#### 2.2.2. Diagnosis

We defined the subjects who had been smoking at least one cigarette per day for 1 year as current smokers, and those who used to smoke but have not smoked in the past 1 year as past smokers. Current smokers and past smokers were all included as ever smokers. We defined nicotine dependence as having the FTND score of 4 or higher.

We diagnosed major psychiatric disorders including AUD according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994), mild cognitive impairment (MCI) according to the consensus criteria from the International Working Group on MCI (Winblad et al., 2004), and stroke according to the WHO criteria (Hatano, 1976).

#### 2.2.3. Statistical analyses

Prevalence rates were calculated by gender and age strata. Standardized prevalence rates for elderly Koreans were estimated using a direct standardization method, in which the prevalence rates were adjusted by age and sex to the total Korean population based on the 2010 national census.

To examine the differences in socio-demographic and smoking characteristics between past smokers and current smokers, independent *t*-test for continuous variables and Pearson's chi-squared test of Fisher's exact test for dichotomous variables were used. Continuous variables such as the FTND scores were compared between age groups using analysis of variance (ANOVA).

After each variable including sociodemographic factors, major neuropsychiatric disorders, characteristics of smoking behaviors and CIRS scores was entered in the model, stepwise logistic regression analysis was used to identify the factors associated with smoking cessation. Odd ratios (OR) with 95% confidence intervals were estimated. All statistical analyses were performed using the SPSS 17.0 statistical package.

## 3. Results

Among the 1118 randomly sampled subjects, 714 agreed to participate in the study (response rate = 63.9%). The mean age was $71.9 \pm 5.7$ and the percentage of women was 57.8%. The respondents were relatively young (quartile 1 = 67 years old, median = 71 years old, quartile 3 = 76 years old, $\chi^2 = 47.58$, *d.f.* = 1, $p < 0.01$, Kruskal–Wallis test) and included fewer women (women = 70.8%, $p < 0.01$, Chi-square test).

Among the 714 respondents, 455 had never smoked. Among the 259 ever smokers, 86 (33.2%) were current smokers. Age- and gender-standardized prevalence of ever smoker, past smoker and current smoker among the elderly Koreans aged 65 and over were estimated to be 36.3% (95% CI = 32.7–39.8), 24.4% (95% CI = 21.2–27.5) and 11.9% (95% CI = 9.5–14.3), respectively. Smokers were much more prevalent in men than in women. In men, the prevalence of ever smoker, past smoker and current smoker were 74.4% (95% CI = 69.5–79.4), 51.2% (95% CI = 45.5–56.8) and 23.3% (95% CI = 18.5–28.0), respectively. In women, those of ever smoker, past smoker and current smoker were 8.5% (95% CI = 5.8–11.2), 4.6% (95% CI = 2.6–6.6) and 3.9% (95% CI = 2.0–5.7). In addition, the prevalence of ever smoker and current smoker did not significantly