

## Differential Effect of Modifiable Lifestyle Factors on Chronic Kidney Disease (CKD) in Korean Men and Women : Results from Korean National Health and Nutrition Examination Survey (NHANES)

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**Purpose** : There have been increasing evidences that modifiable lifestyle factors such as smoking, consumption of alcohol, physical inactivity impact on the risk of developing CKD. Despite a number of literatures regarding lifestyle factors as a risk for CKD in Western and European countries, there are few reports in Asian countries having different lifestyle. In order to identify modifiable risk factors associated with CKD in a general population in Korea, we analyzed the relationship between lifestyle factors and CKD, with particular emphasis on the role of smoking, alcohol consumption, and physical activity.

**Methods** : We performed a cross-sectional analysis of the data of Korean NHANES in 2001. The Korean NHANES is a health survey of a nationally representative sample of the Korean population. Total 5,976 people (2,559 of men, 3,417 of women) at age older than 20 years were available for analysis for the prevalence of CKD. CKD was defined as existing more than (1+) of dipstick proteinuria or a reduced GFR of less than 60 mL/min/1.73m<sup>2</sup> by MDRD formula. We analyzed whether current exposure to smoking, alcohol consumption, and physical inactivity was associated with CKD with subanalysis of dose responses of each risk factors. Risk analysis was performed with an adjustment of other demographic and clinical parameters such as age, gender, body mass index (BMI) and blood pressure.

**Results** : The prevalence of CKD in Korean general population was 9.37% (7.7% in men, 10.62% in women). In univariate analysis, odds ratio for CKD was higher in people with heavy smoking of more than 40 pack-year (PYR) or physical inactivity. In subgroup analyses by gender, multivariate analysis in male subjects revealed that past and current alcohol drinking had higher odds ratio for CKD [OR=2.10 in current alcohol (95% CI 1.25-3.53), p=0.05 vs OR=1.63 in past alcohol (95% CI 1.17-2.27), p=0.04] without dose-response relation of alcohol. Smoking was not associated with the prevalence of CKD in male. In female, exposure to smoking of more than 20 PYR was a risk factor for CKD [OR=2.64 (95% CI 1.31-5.30), p=0.006], and current smoking was also risk factor for CKD. Past or current exposure to alcohol was not associated with development of CKD, but heavy alcohol drinking (more than 2 bottles of Soju per ingestion) had a higher odds ratio for CKD [OR=4.17 (95% CI 1.04-16.77), p=0.044].

**Conclusion** : In Korean population-based cohort, modifiable lifestyle factors were profoundly associated with CKD independent of age, BMI or blood pressure. Interestingly, there was a differential effect of smoking, alcohol consumption and physical inactivity on the prevalence of CKD in male and female population. Female heavy smokers or heavy alcohol drinkers were found to be linked to CKD whereas there was no dose-response trend in male. Further understanding of the differential effect of the modification of these lifestyle risk factors in men and women may impose a potential beneficial effect to prevent the development and aggravation of CKD.