Medical risk factors associated with Parkinson's disease: a 10-year population-based study in Korea

Han Eol Cho[1*], Hyun Sun Lim[2], Jiook Cha[2], Kun Jae Lee[3], Hyoung Seop Kim[3†]

Yonsei University College of Medicine, Department of Rehabilitation Medicine[1], Research and analysis team, National Health Insurance Service Ilsan Hospital[2], Department of Rehabilitation Medicine, National Health Insurance Service Ilsan Hospital[3]

Introduction
Past research has investigated possible risk factors associated with the onset of Parkinson's disease (PD). However, such studies have rarely included Asian patients. We herein investigate which factors affect the onset of (PD) in the South Korean population.

Methods
This nation-wide study was performed by applying data from the National Health Insurance Database and Health Insurance Review and Assessment Service on reimbursement claims and health check-ups in 2002 and 2003 to a 10-year follow-up cohort model. Of the 5,147,950 people who underwent regular health check-ups during this period, 10%(514,795) were randomly selected. During follow-up, we identified 7,746 patients with PD. We examined age, hypertension, diabetes, use of statin, body mass index, smoking, alcohol consumption, socioeconomic status, depression and anxiety as possible risk factors for PD.

Results
The adjusted HRs of the subjects aged 50-59, 60-69, 70-79, and 80 years or older were 3.101, 8.958, 14.709, and 16.797, respectively; all HRs were statistically significant ($p < 0.0001$). When comparing the prevalence among men and women, the adjusted HR of women was 0.971, which was statistically insignificant ($p = 0.3273$). In cases of hypertension, diabetes, depression, and anxiety, the adjusted HRs were 1.259, 1.255, 1.554, and 1.808, respectively, ($p < 0.0001$ for all). The adjusted HR of the group taking statins was 1.157, which was higher than that of the group not taking statin at the time of diagnosis. Relative to the normal weight group, the risk of PD was only higher in the highest BMI group (BMI > 30.0, $p < 0.0001$). The adjusted HRs of ex-smokers and current smokers were not significantly different (0.920), but that of current smokers was statistically significant ($p < 0.0287$). Except for the almost-daily-drinking group ($p = 0.6530$), the adjusted HRs of all alcohol-drinking groups were < 1 and were statistically significant ($p < 0.0001$). As Medicaid was set as the standard, the adjusted HR was < 1 in all groups ($p < 0.05$), indicating that SES and PD were closely related.

Conclusion
We found no difference in the prevalence of PD between men and women. Age; vascular risk factors, including the history of hypertension, diabetes, and use of statin; severe obesity; non-smoking; and non-alcohol drinking may increase the risk of PD. We further

found an association between lower socioeconomic status and the risk of PD. Depression and anxiety are related to PD, but further study is needed to identify whether they are risk factors or an initial symptom of PD. Though the findings of the present study benefited from an immense dataset, future studies should validate our findings.