



# Antidiabetic Drugs and the Incidence of Parkinson's Disease in Patients with Type 2 Diabetes: A Case-Control Study

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## Introduction

### Parkinson's disease (PD)

- The second most common neurodegenerative disease.
- The prevalence of PD is increasing with an aging population.

### Diabetes mellitus (DM) and neurodegenerative disease

- Many meta-analyses have suggested that DM may have a risk effect on neurodegenerative disease.
- In the past decade, antidiabetic drugs have been reported to have a potential protective effect on the incidence of PD based on pathological and epidemiological evidence.
- However, reports of prevention effects on PD have been inconsistent among antidiabetic agents.

## Objectives

- To investigate the association between the use of antidiabetic drugs and PD occurrence in patients with type 2 DM
- To compare the effect on PD incidence according to the type of antidiabetic drugs

## Methods

### A nationwide population-based case-control study

- Using the Korean national health insurance claims database
- Elderly patients (aged  $\geq 60$  years) diagnosed with type 2 DM between January 1, 2009, and December 31, 2017
- Patients newly diagnosed with PD were included in the case group, and patients without PD were included in the control group.
- A 1-year lag time was applied to minimize the reverse causal relationship of PD.
- Case groups were followed until the date of diagnosis of PD, and control groups were followed until the day of death or last claim record.
- Antidiabetic drugs included metformin, sulfonylureas (SU), thiazolidinediones (TZD), and DPP-4 inhibitors.

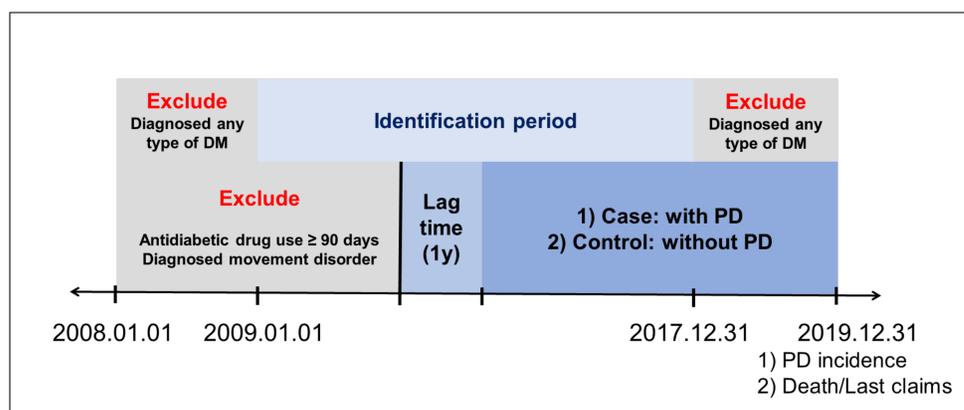


Figure 1. Study design

### Exclusion criteria

- Patients who had been
  - diagnosed with any type of DM before 2009 or after 2017.
  - prescribed antidiabetic drugs before the index date (date diagnosed with DM).
  - diagnosed with Parkinsonism before the index date.
  - died or diagnosed PD in lag-time period.

### Statistical analysis

- 1:1 propensity score matching was performed based on sociodemographic characteristics, comorbidities, and concurrent drugs.
- Cox proportional hazard regression adjusted for age, sex, type of insurance, comorbidities, and use of concomitant medications, was used to estimate the association between antidiabetic drugs and the incidence of PD.

## Results

- A total of 85,657 subjects were identified, of which 2,616 patients were included in the case and control groups.

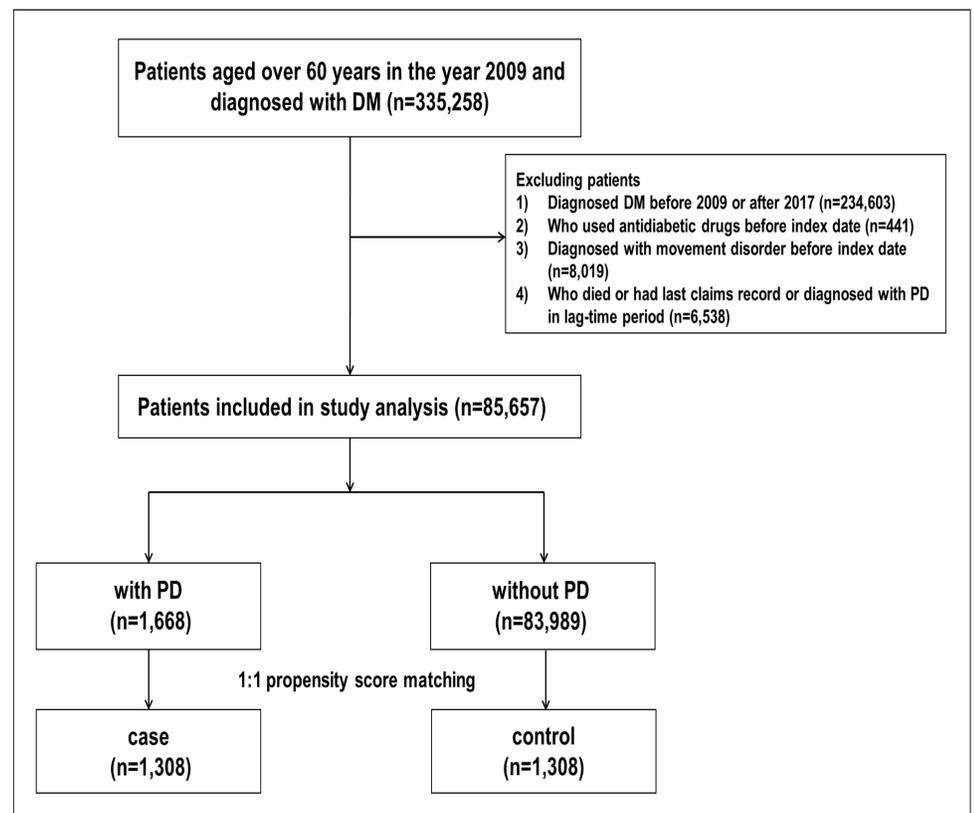


Figure 2. Flow chart of study population selection

### Prevention effect of DPP-4 inhibitors on PD

- The use of DPP-4 inhibitors was associated with a reduced risk of PD occurrence compared to non-user (adjusted hazard ratio [aHR] 0.68; 95% confidence interval [CI]: 0.57-0.83).
- The use of metformin, sulfonylureas, and thiazolidinediones was not significantly associated with the risk of developing PD.

|                  | Subject | Person-years | Event | aHR(95%CI)       |
|------------------|---------|--------------|-------|------------------|
| metformin        | 726     | 4470         | 373   | 0.97 (0.83-1.14) |
| SU               | 367     | 2211         | 174   | 0.87 (0.71-1.05) |
| TZD              | 64      | 441          | 34    | 0.99 (0.69-1.41) |
| DPP-4 inhibitors | 417     | 2709         | 192   | 0.68 (0.57-0.83) |
| Age              | 2329    | 12312        | 1168  | 1.61 (1.35-4.93) |
| Sex              | 1307    | 7155         | 629   | 1.03 (0.92-1.16) |
| Insurance        | 262     | 1268         | 134   | 1.20 (1.00-1.44) |

Table 1. Cox regression analysis on the association between the use of antidiabetic drugs and the risk of PD incidence

## Conclusions

- The use of DPP-4 inhibitors may be associated with a reduced risk of PD.
- Further studies on larger sample sizes are required.

## References

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