

# Different risk of early-onset (< 50 years) and late-onset (≥50 years) Parkinson's disease in people with mental illness

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## Objectives

The worldwide incidence of early-onset Parkinson's disease (EOPD) is significantly increasing. Although psychosocial problems are common and have a significant impact on the life of people with early-onset Parkinson's disease (EOPD), there have been only few studies focusing on the association between these two conditions. This study aimed to investigate the association of various mental illnesses with the risk of EOPD (<50 years) and compare it with that of late-onset PD (LOPD) (≥50 years), using nationwide population-based cohort in Korea.

## Methods

We used data from the Korean National Health Insurance Service (NHIS) and the National Health Screening databases for our analysis. This nationwide cohort study enrolled people who had undergone a national health screening examination on 2009, and followed up until December 31, 2018 or the date of death. Various mental illnesses, such as depression (F22, F23), bipolar disorder (F30, F31), schizophrenia (F20), insomnia (F51.0, G470), and anxiety (F40, F41), were identified based on ICD-10 codes. PD is defined by ICD-10 code (G20) and a rare intractable disease registration code (V124). Cox proportional hazard regression models were used to evaluate the risk of EOPD and LOPD according to the presence of mental illnesses. A p value of < 0.05 was considered statistically significant.

## Results

**Table 1.** Cox proportional hazard regression analysis on the risk of Parkinson's disease in individuals with mental disorders stratified by age

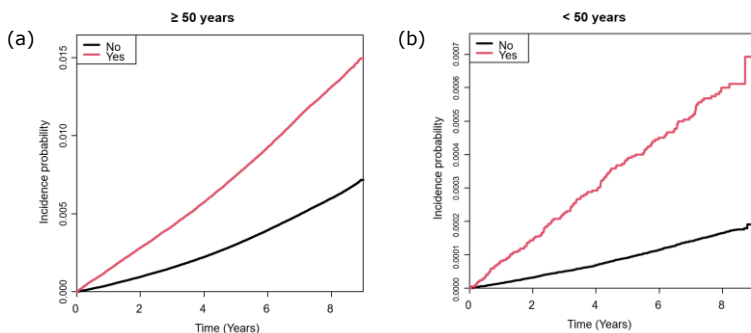
Age (years)	Mental disorders	N	PD	Person-years	Incidence rate	Model 1	Model 2	Model 3
<b>Total</b>								
Age < 50	No	5377193	744	36529072.7	0.020	1.00	1.00	1.00
	Yes	330726	144	1937696.7	0.074	3.72 (3.12-4.45)	3.19 (2.67-3.81)	3.11 (2.61-3.72)
Age ≥ 50	No	3473779	21621	28153116.2	0.768	1.00	1.00	1.00
	Yes	738824	9765	5877001.8	1.662	2.17 (2.11-2.22)	1.74 (1.70-1.78)	1.70 (1.66-1.74)
p for interaction						<.0001	<.0001	<.0001
<b>Men</b>								
Age < 50	No	3237319	477	22412088.4	0.021	1.00	1.00	1.00
	Yes	142058	86	878846.4	0.098	4.68 (3.72-5.89)	3.97 (3.15-4.99)	3.88 (3.08-4.88)
Age ≥ 50	No	1786177	11247	14275180.4	0.788	1.00	1.00	1.00
	Yes	251108	3553	1922247.1	1.848	2.36 (2.27-2.45)	1.75 (1.68-1.82)	1.71 (1.64-1.78)
p for interaction						<.0001	<.0001	<.0001
<b>Women</b>								
Age < 50	No	2139874	267	14116984.3	0.019	1.00	1.00	1.00
	Yes	188668	58	1058850.4	0.055	2.97 (2.23-3.94)	2.44 (1.84-3.24)	2.42 (1.83-3.22)
Age ≥ 50	No	1687602	10374	13877935.9	0.748	1.00	1.00	1.00
	Yes	487716	6212	3954754.7	1.571	2.10 (2.04-2.17)	1.73 (1.67-1.78)	1.69 (1.64-1.75)
p for interaction						0.0184	0.0172	0.0134

Model 1: unadjusted

Model 2: adjusted for age and sex

Model 4: adjusted for age, sex, smoking, alcohol consumption, physical activity, income level, body mass index, diabetes mellitus, hypertension, and dyslipidemia

**Figure 2.** Kaplan-Meier curves for cumulative incidence of PD according to age in individuals with mental disorders



## Conclusion

Our results suggested that males with mental illnesses aged < 50 years are at a more increased PD risk than those aged ≥ 50 years, which needs clinical attention. Future studies to elucidate the pathomechanism for EOPD related with mental illness are warranted.