Incidence and Risk Factors for Psychiatric Disorders Across Different Health Insurance Systems in Japan

EPH237

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BACKGROUND

- Japan has adopted a universal health insurance system, which mainly consists of the citizens' health insurance (NHI), employee-based health insurance for medium and large companies (EHI), and those for small companies, each accounting for approximately one-third. NHI insureds are mainly self-employed and/or retired people. People aged ≥75 years are covered by the medical care system for the advanced elderly.
- Although these systems have the same coverage and reimbursement, our previous study showed that medical costs and the prevalence of mental diseases were higher in NHI than in EHI.[1] The higher medical costs and prevalence were suggested to be due to more frequent long-term hospitalizations for schizophrenia and depression in NHI.[2]
- However, the causal relationship between the prevalence or medical costs and insurance type remains unclear. Previous studies did not examine whether the higher prevalence within the NHI system is associated with a higher incidence rate of the conditions or due to a switch from EHI after developing the conditions.

1. Iwasaki et al. EPH115 Medical Cost and Prevalence of Diseases Across Different Health Insurance Systems in Japan. ISPOR Europe 2022, Vienna, Austria, 2022.
2. Iwasaki et al. EPH226 Medical Cost and Prevalence of Mental Diseases across Different Health Insurance Systems in Japan. ISPOR 2023, Boston, MA, USA, 2023.

METHODS

Study design

- Cross-sectional study using claims databases

Data source

- Commercially available Japanese claims databases, provided by JMDC Inc. (JMDC database), including data from 13,665,051 insureds of EHI (Jan. 2005-Sep. 2021), and provided by DeSC Healthcare, Inc. (DeSC database), including data from 908,237 and 7,147,428 insureds of EHI and NHI, respectively (April 2014-August 2021)

Study population

- EHI: Individuals covered by EHI in 2020 in the JMDC database or DeSC database. The group consisted of persons covered as employees (EHI-employee) and those covered as family members of employees (EHI-family).
- NHI: Individuals covered by NHI in 2020 in the DeSC database.

Analysis

1. Differences in the annual incidence of schizophrenia or depression between EHI and NHI by demographic groups in 2020
   - ✓ The annual incidence of schizophrenia or depression was calculated by dividing the member months of newly diagnosed patients with the disease in 2020 by member months of all insureds in 2020.
   - ✓ Newly diagnosed patients with schizophrenia or depression were defined as individuals who had a record of a first date of medical care for schizophrenia or depression, as defined by standard disease names, in 2020.
2. Factors associated with the incidence of schizophrenia using logistic regression analysis
   - ✓ Individuals aged 20-69 years who had annual check-up data in 2020 were analyzed.
   - ✓ Odds ratios for the incidence of schizophrenia were calculated for insurance type, as well as age, sex, Charlson Comorbidity Index (CCI), and annual medical check-up data.
     - ❖ Insurance type was EHI-employee or EHI-family to NHI (reference).
     - ❖ Annual medical check-up data: Body mass index (BMI), systolic blood pressure, triglyceride, high-density lipoprotein cholesterol, aspartate aminotransferase, hemoglobin A1C, hemoglobin, creatinine, smoking (habitual smoker or not), exercise (doing regular exercise for ≥1 year or not), drinking (drinking alcohol every day or not), and sleep (rested enough with sleep or not).
     - ❖ Missing values of the annual check-up data were imputed using the expectation-maximization algorithm.

RESULTS AND DISCUSSIONS

Analysis 1. Differences in the annual incidence between NHI and EHI by demographic groups

Schizophrenia

- The annual incidence was higher in NHI than in EHI in all demographic groups (Table 1A).
  - → The higher prevalence within the NHI system may be due to the presence of additional risk factors for the disease, which may be associated with the background of NHI insureds, such as socioeconomic background.
  - → However, there may be differences in the health status of NHI and EHI insureds, which may be associated with the incidence of the disease. In addition, patients newly diagnosed with schizophrenia in the NHI may include those who developed schizophrenia and had difficulty working due to the symptoms and then were diagnosed after transferring from the EHI to the NHI due to quitting work.

Depression

- The annual incidence was similar or even lower in some age groups in men in the NHI than in those in the EHI (Table 1B).
  - → The higher prevalence within NHI may not be due to the presence of additional risk factors but to other reasons, such as switching from EHI after developing the disease.

Table 1. Annual incidence and medical costs of newly diagnosed patients with schizophrenia (A) or depression (B) by insurance types and age-sex groups(20-69 years) in 2020

A Schizophrenia

Sex	Age	NHI		EHI		NHI/EHI
		MMOS	Incidence	MMOS	Incidence	Incidence
Men	20-24	839,912	0.34%	4,322,12,8	0.19%	1.81
	25-29	806,426	0.50%	4,431,084	0.21%	2.45
	30-34	841,973	0.50%	4,512,918	0.17%	2.94
	35-39	1,034,424	0.47%	4,772,783	0.16%	3.04
	40-44	1,215,871	0.43%	5,088,057	0.15%	2.85
	45-49	1,493,298	0.43%	5,885,066	0.15%	2.97
	50-54	1,402,742	0.39%	5,406,798	0.15%	2.61
	55-59	1,307,189	0.39%	4,770,608	0.14%	2.71
	60-64	1,738,932	0.37%	3,100,173	0.13%	2.93
	65-69	3,741,986	0.29%	1,461,618	0.16%	1.88
Women	20-24	791,271	0.71%	3,468,547	0.37%	1.90
	25-29	783,981	0.82%	3,128,725	0.34%	2.42
	30-34	815,287	0.68%	3,430,718	0.26%	2.66
	35-39	930,436	0.57%	3,983,503	0.21%	2.71
	40-44	1,044,655	0.60%	4,526,558	0.18%	3.31
	45-49	1,290,303	0.48%	5,334,628	0.16%	2.90
	50-54	1,237,987	0.47%	4,645,916	0.17%	2.78
	55-59	1,379,883	0.36%	3,743,446	0.17%	2.09
	60-64	2,325,099	0.25%	2,340,784	0.14%	1.79
	65-69	4,521,971	0.22%	1,140,779	0.16%	1.40

B Depression

Sex	Age	NHI		EHI		NHI/EHI
		MMOS	Incidence	MMOS	Incidence	Incidence
Men	20-24	839,912	0.65%	4,322,128	0.74%	0.88
	25-29	806,426	0.88%	4,431,084	0.97%	0.91
	30-34	841,973	0.85%	4,512,918	0.83%	1.01
	35-39	1,034,424	0.72%	4,772,783	0.73%	0.98
	40-44	1,215,871	0.65%	5,088,057	0.68%	0.95
	45-49	1,493,298	0.59%	5,885,066	0.63%	0.93
	50-54	1,402,742	0.56%	5,406,798	0.60%	0.94
	55-59	1,307,189	0.56%	4,770,608	0.49%	1.13
	60-64	1,738,932	0.47%	3,100,173	0.34%	1.39
	65-69	3,741,986	0.37%	1,461,618	0.28%	1.31
Women	20-24	791,271	1.55%	3,468,547	1.17%	1.32
	25-29	783,981	1.59%	3,128,725	1.28%	1.24
	30-34	815,287	1.27%	3,430,718	0.90%	1.41
	35-39	930,436	1.03%	3,983,503	0.74%	1.38
	40-44	1,044,655	0.95%	4,526,558	0.65%	1.48
	45-49	1,290,303	0.85%	5,334,628	0.57%	1.48
	50-54	1,237,987	0.77%	4,645,916	0.55%	1.39
	55-59	1,379,883	0.69%	3,743,446	0.47%	1.48
	60-64	2,325,099	0.54%	2,340,784	0.42%	1.28
	65-69	4,521,971	0.49%	1,140,779	0.39%	1.24

Abbreviations: EHI, employee-based health insurance for medium and large companies; MMOS, member months; NHI, Citizens' Health Insurance.

Analysis 2. Factors associated with the incidence of the disease using logistic regression analysis

- To assess the association between the incidence of schizophrenia and insurance type shown in Analysis 1, a logistic regression analysis was performed to adjust for other factors that may be related to the incidence.
- The odds ratio of the incidence was <1 for some factors, such as sleep. The odds ratio was lower for insurance type than that for other factors.
  - → Insurance type was suggested to be highly associated with the incidence of schizophrenia after adjusting for factors, including demographics, CCI, and annual medical check-up data.

Table 2. Odds ratios by logistic regression for the incidence of schizophrenia

Parameter	Odds ratio (95% CI)	P-value
Age	0.971 (0.968, 0.973)	<0.001
Sex	0.987 (0.916, 1.064)	0.729
CCI	1.911 (1.845, 1.980)	<0.001
BMI	1.016 (1.009, 1.024)	<0.001
SBP	0.992 (0.990, 0.994)	<0.001
TG	1.001 (1.001, 1.002)	<0.001
HDL-C	1.002 (1.000, 1.004)	0.035
AST	1.005 (1.004, 1.006)	<0.001
HbA1c	0.810 (0.767, 0.855)	<0.001
Hb	0.918 (0.897, 0.939)	<0.001
Creatinine	0.947 (0.869, 1.033)	0.218
Smoking	1.196 (1.121, 1.275)	<0.001
Exercise	0.950 (0.886, 1.018)	0.142
Drinking	0.740 (0.684, 0.801)	<0.001
Sleep	0.670 (0.636, 0.706)	<0.001
EHI-employee	0.498 (0.452, 0.549)	<0.001
EHI-family	0.578 (0.513, 0.652)	<0.001

Abbreviations: CCI, Charlson Comorbidity Index; BMI, body mass index; SBP, systolic blood pressure; TG, triglyceride; HDL-C, high-density lipoprotein cholesterol; AST, aspartate aminotransferase; Hb, hemoglobin; EHI, employee-based health insurance for medium and large companies.

Note: Sex, men (1) or women (2); Smoking, habitual smoker (1) or not (0); Exercise, doing ≥30 minutes of exercise ≥2 times a week for ≥1 year (1) or not (0); Drinking, drinking alcohol every day (1) or not (0); Sleep, rested enough with sleep (1) or not (0).

Limitations

- The accuracy of the claims and check-up data used in the study affected the results.
- The study population in the logistic regression analysis may have less generalizability because all had annual medical check-ups.

CONCLUSIONS

- The differences in the background of the insureds between NHI and EHI may be associated with the development of schizophrenia, resulting in the higher prevalence in NHI, not due to a switch from EHI after the development of the disease.
- The higher prevalence of depression in NHI may not be associated with the background of the insureds, but due to other reasons, such as switching from EHI after developing these diseases.

Conflicts of Interest: This study was funded by Shionogi & Co., Ltd. KI, CH, TT are employees of Milliman, which has received consultancy fees from Shionogi & Co., Ltd. YS and SH are employees of Shionogi & Co., Ltd. SH owns company stock in Shionogi & Co., Ltd. TS and GT are employees of JMDC Inc., which has provided data for this study. AH is an employee of DeSC Healthcare, Inc., which has provided data for this study. AI received lecture fee from Shionogi & Co., Ltd. and belongs to an endowed department funded by Takeda Pharmaceutical Co., Ltd.