Incidence of postpartum mental and behavioral disorders in Japan

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BACKGROUND/OBJECTIVES

- Postpartum depression (PPD) develops at a critical stage of a woman's life, and the likelihood of depressive symptoms could be twice as high as in other periods of life.[1] PPD is often left untreated and can persist for a long time. Negative impacts are expected on subsequent family plannings and parenting behaviors of the affected family.
- The Japanese government recognizes the need to support women before and after childbirth amid a declining birth rate.[2] PPD is one of the targets regarding this support.
- This study aimed to understand the development of PPD among Japanese women using claims data. In this study, we evaluated the incidence of mental and behavioral disorders, not limited to depression. Since PPD is reportedly underdiagnosed,[3] we deemed it necessary to observe symptoms associated with depression, such as anxiety. In addition, there is the possibility that other psychiatric disorders, such as developmental disorders, will be diagnosed in patients with PPD, considering the recommendation in the mental health care manual for expectant and nursing mothers. In the manual, women with a high mental screening score, either with persistent psychiatric symptoms, significant impairment of life functions, and a need for care by family members and someone around them, or at risk of suicide, are recommended to be referred to psychiatrists.[4]

References

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2. Ministry of Internal Affairs and Communications. [Status of Corrective Action (first follow-up) in Response to the Recommendation based on the results of the "Administrative Evaluation and Monitoring of Child-Rearing Support: Focus on Prenatal and Postnatal Support". 2023. Japanese.
3. Ko JY, et al. Depression and treatment among U.S. pregnant and nonpregnant women of reproductive age, 2005–2009. J Womens Health. 2012;21:830–6.
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METHODS

Study design

- Cohort and single arm study using a claims database

Data source

- Japanese claims database (April 2014-May 2022) provided by DeSC Healthcare, Inc., including 11,678,722 insureds.
  - ✓ The database included data from insureds of employee-based health insurance, which covers employees of mid-large companies (EHI-employee) and their family members (EHI-family), and citizens' health insurance (NHI), which covers non-/self-employed workers.

Study population

- The study population included women giving birth. Since normal labor is not covered by the health insurance in Japan and cannot be directly identified with the claims, a woman giving birth was identified if a woman had an ID matched with a newborn during the data period and was aged 15–49 years at the childbirth.

Analysis

1. Cumulative incidence of mental and behavioral disorders between women with and without giving birth by cohort study
   - ✓ Selection of individuals in the giving birth and non-giving birth groups (Fig. 1)
     - ❖ Giving birth: Women who gave birth at the age of 20-40 years, ≥1 year of observation period before and after the delivery (defined as index), and no record of diagnosis of mental and behavioral disorders (defined as F00-F99 by ICD-10) before the index
     - ❖ Non-giving birth: Women who did not give birth, were matched to anyone in the giving birth group by sex, birth year and month, insurance type, and first and last year and month of the observation period, and no record of diagnosis of mental and behavioral disorders before the delivery of the matched women (defined as an index for the giving birth group).
   - ✓ Time to the first diagnosis of mental and behavioral disorders from the index was estimated using a Kaplan-Meier method for the giving birth and non-giving birth groups
     - ❖ If multiple numbers of women in the non- giving birth group were matched to one in the giving birth group, those in the non-giving birth group were weighed by the inverse number of those in the non-giving birth group.
     - ❖ The difference in the Kaplan-Meier curves was assessed using a log-rank test.
2. Incidence of mental and behavioral disorders before and after delivery by single arm study
   - ✓ The monthly incidence of mental and behavioral disorders was calculated for women giving birth by month from the delivery and summarized by 3-month period.
   - ✓ The monthly incidence in each period was assessed by comparing the average monthly incidence between 24 months before and 26 months after the index using a z-test. Statistical significance was defined as $p < 0.05$.

RESULTS

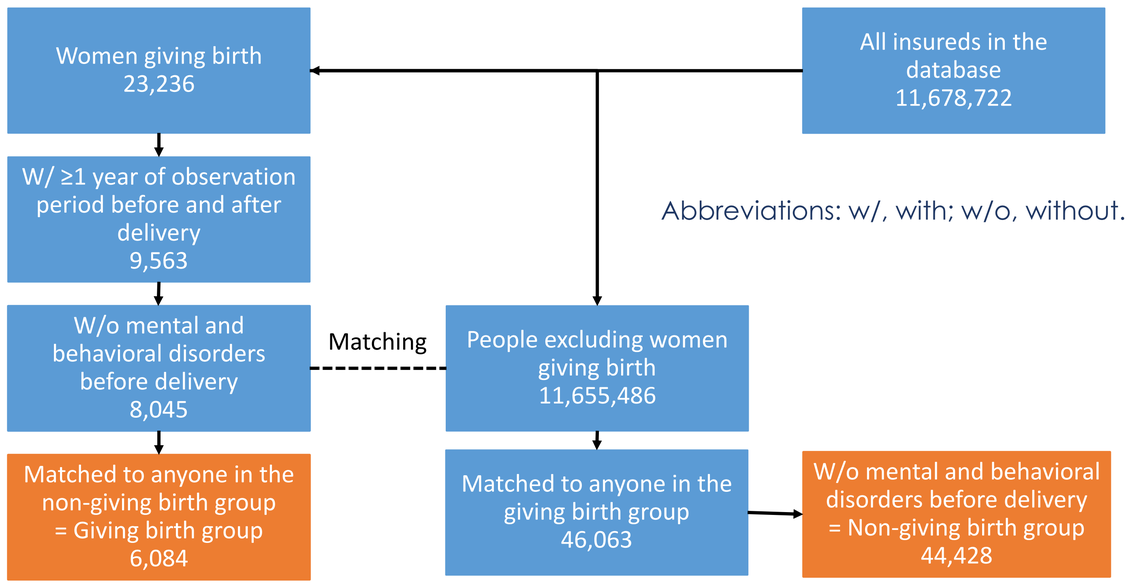
Study population

- In total 23,236 women were identified as those giving birth, including 624 for EHI-employee, 15,773 for EHI-family, and 6,839 for NHI.

Cumulative incidence of mental and behavioral disorders for the giving birth and non-giving birth groups (cohort study)

- As shown in Fig. 1, 6,084 and 44,428 women were identified for the giving birth and non-giving birth groups, respectively.
- The cumulative incidence was higher in the giving birth group than in the non-giving birth group ($p < 0.001$; Fig. 2).

Figure 1. Identification of individuals in each group for the cohort study



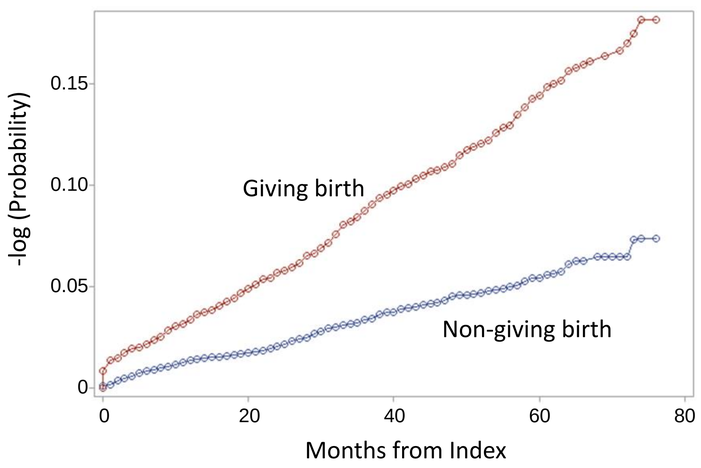


Figure 2. Cumulative incidence of mental and behavioral disorders for the giving birth and non-giving birth groups (negative log Kaplan-Meier curves)

Monthly incidence of mental and behavioral disorders before and after delivery (single arm study)

- Of the 23,236 women giving birth, 4,917 had a record of first diagnosis of mental and behavioral disorders.
- The monthly incidence was the highest during the 3 months after delivery and the lowest during the 6 months before delivery with statistical significance (Table 1).

Table 1. Monthly incidence of mental and behavioral disorders before and after delivery in women giving birth

MFI*	Number Num	Number Den	Monthly incidence	95% CI Lower	95% CI Upper	P value
-24–-22	39	14,373	0.091%	0.041%	0.140%	0.488
-21–-19	62	17,542	0.118%	0.067%	0.169%	0.141
-18–-16	61	21,059	0.097%	0.055%	0.139%	0.376
-15–-13	83	25,303	0.109%	0.069%	0.150%	0.175
-12–-10	101	29,916	0.113%	0.075%	0.151%	0.123
-9–-7	86	35,662	0.080%	0.051%	0.110%	0.273
-6–-4	76	43,935	0.058%	0.035%	0.080%	0.004
-3–-1	91	53,611	0.057%	0.036%	0.077%	0.001
0–2	345	58,815	0.196%	0.160%	0.232%	<0.001
3–5	123	55,780	0.074%	0.051%	0.096%	0.089
6–8	124	53,300	0.078%	0.054%	0.101%	0.167
9–11	131	50,852	0.086%	0.060%	0.111%	0.389
12–14	110	48,259	0.076%	0.051%	0.101%	0.147
15–17	118	45,840	0.086%	0.059%	0.113%	0.392
18–20	103	43,640	0.079%	0.052%	0.105%	0.214
21–23	82	41,445	0.066%	0.041%	0.091%	0.035
24–26	91	39,402	0.077%	0.050%	0.104%	0.189

Note: *In the MFI column, 0 indicates the month of delivery, and negative and positive values indicate before and after delivery, respectively.

Abbreviations: CI, confidence interval; Den, denominator; MFI, months from index; Num, numerator.

LIMITATIONS

- Since information on normal labor is absent in the claims, we identified women giving birth based on the newborn's ID, which indicates dependency status. Therefore, not all women giving birth may have been identified. Consequently, the study population may lack generalizability. In addition, some women may be included in the non-giving birth group in the cohort study.
- The incidence of a disease was defined based on the record of the first diagnosis in the database; those who developed a disease but did not visit a hospital could not be included. Therefore, the availability of chance and time may be associated with the difference in the incidence.
- Factors that were not available in the database, such as the availability of their partners' support and economic situation, may be associated with the development of these diseases. However, the factors could not be matched between the groups in the cohort study.
- Women who develop depression may avoid childbirth, which may cause a bias in the single arm study.
- Although the length of the observation period varied for everyone, all individuals available in each period were included as the denominator in the single arm study to ensure sample size. That is, the population differed between the periods.

CONCLUSION

- The incidence of mental and behavioral disorders was higher in Japanese women giving birth than matched women without giving birth, as well as after delivery than before. Although some limitations, including identification of the study population should be considered, we believe this finding suggests the importance of paying attention to maternal mental health.

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. 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.