Current Issues within the Perinatal Mental Health Care System in Japan: A Cross-Sectional Questionnaire Survey

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Abstract

Background: Mental illness commonly occurs in reproductive age, and its adverse effects on mothers and children are a major public health concern. However, the extent to which the perinatal mental health care system in Japan is functioning adequately remains unexplored. This study aimed to identify the issues that exist within the perinatal mental health care system in Japan.

Methods: A cross-sectional survey was conducted across medical facilities in Aichi prefecture in central Japan. Questionnaires were mailed to the head physicians of all 128 maternity care units, 21 neonatal intensive care units (NICUs), and 40 assisted reproductive technology (ART) units. The following data were collected: the number of admissions to mental health care units and admissions of neonates born to mothers with mental illness during the perinatal period between 2016 and 2018. Perspectives on psychotropic drug use during pregnancy were compared across different types of maternity care units, including maternal-fetal (MF) centers and private clinics by Fisher's exact test. The multidisciplinary team system was also compared across different types of maternity care units by Fisher's exact test.

Results: The number of admissions to mental health care units was 82 (52.8 per 10 000 births), and 158 (1.0 per 1000 births) neonates born to mothers with mental illness were admitted to NICUs during the aforementioned period. With regard to the multidisciplinary team system, 84 (71.1 %) and 76 (64.4 %) maternity care units did not have any psychiatrists or social workers. Moreover, only 5 % of the head physicians in MF centers endorsed the discontinuation of psychotropic drug use during pregnancy. The corresponding figures were 20–35 % among those in general hospitals, private clinics, and ART units.

Conclusions: Multidisciplinary system resources were perceived to be limited. Perspectives on psychotropic drug use during pregnancy differed significantly based on the type of units in which the doctors were working. There is a need for resources that will facilitate the admission of perinatal women with mental illnesses to mental health care units in Japan.

Background

Approximately 10–15 % of women worldwide experience mental illness during the perinatal period [1], and growing evidence suggests that mental illness has negative effects on the health of mothers and their children. It has been suggested that, during the perinatal period, women with mental illness should receive care from a multidisciplinary team that includes psychiatrists, obstetricians, midwives, psychologists, and social workers [2]. Further, it has been noted that women with mental illness should be in collaboration with psychiatric service providers during the perinatal period [3]. However, the following questions about the healthcare system in Japan remain unanswered: i) how many pregnant and postpartum women are hospitalized in mental health care units?; ii) what is the level of accessibility to psychiatrists or social workers in maternity care units?; and iii) how many neonates born to mothers with mental illness require admission to neonatal intensive care units (NICUs)?
In Canada, 7.1% of women use psychotropic medication during pregnancy [4]. The risk of relapse of major depression is substantially higher after the discontinuation of drug intake during pregnancy [5]. A recent systematic review also concluded that discontinuing psychotropic drug treatment increases the risk of relapse, recurrence, and suicide [6]. However, there is insufficient literature on the assessment of the risk-benefit ratio for psychotropic drug use during pregnancy [7,8] because randomized controlled trials have not been conducted owing to ethical issues. Clinicians are required to make decisions about the drug use based on the results of animal studies and retrospective studies on short-term pregnancy outcomes, including teratogenicity and low birth weight [9]. However, the literature on the long-term neurobehavioral consequences of drug use is limited, and the safest psychotropic drugs for pregnant women are yet to be identified [7]. Moreover, studies have found that maternal mental illness has adverse effects on children. Therefore, decisions about psychotropic drug use and discontinuation during pregnancy should be made carefully [7].

It has been recommended that one should minimize the number of drugs that are consumed and switch to drugs that have been found to be safer (if possible) before conception [10]. It has recently been suggested that mental health should also be considered as an important preconception health indicator [11]. The new perinatal community-based mental health services that are offered in England provide preconception counseling to all referred women with moderate to severe mental illness who are planning a pregnancy [12]. However, perspectives on drug use during pregnancy among doctors who work in maternity care units and assisted reproductive technology (ART) units in Japan. Fertility therapy affords one the opportunity to support planned pregnancy and provide preconception counseling to women with mental illnesses in collaboration with psychiatrists who could work.

The aim of this study was to survey the perinatal mental health care system and examine perspectives on psychotropic drug use during the perinatal period among doctors in Aichi prefecture in central Japan.

**Methods**

**Setting**

A cross-sectional survey was conducted across medical facilities in Aichi prefecture in central Japan. A total of 187,892 babies were born in Aichi prefecture between 2016 and 2018, and they accounted for 6.6% of livebirths in Japan during this period (n = 2,841,788; The Japan Ministry of Health, Labour and Welfare Vital Statistics of Japan; https://www.mhlw.go.jp/toukei/list/81-1a.html). In 2019, there were 128 maternity care units in Aichi prefecture. They included 20 maternal-fetal centers (MF centers), 19 general hospitals, and 89 private clinics (Fig. 1.).

**Design**

Questionnaires were mailed to the head physicians of all the 128 maternity care units, 21 NICUs, and 40 ART units in Aichi between April and December 2019. The questionnaire elicited opinions about psychotropic drug use during pregnancy, the multidisciplinary care system, and preconception care during
fertility treatment. The following details were also collected: the number of deliveries, patients who were admitted to mental health care units during the perinatal period, and neonates who were born to mothers with mental illnesses and admitted to NICUs between April 2016 and March 2019 as well as the number of in vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI), and frozen embryo transfer (FET) treatment cycles between January and December 2017.

**Statistical analysis**

Statistical analysis was conducted using JMP Pro 15 (JMP Japan, Tokyo, Japan). Responses to each question were summarized by computing frequencies and percentages. The different types of medical care units, namely, MF centers, general hospitals, private clinics, and ART units, were compared. Temporal (yearly) changes in the rate of admission to mental health care units were also examined. Categorical variables were examined using Fisher’s exact test. Statistical significance was assessed at p < 0.05

**Results**

**Response rates**

A total of 118 maternity care units (92 %) responded and provided the number of deliveries. Only 10 private clinics failed to respond. All the MF centers and general hospitals responded to the questionnaire. A total of 155 417 infants were born in these maternity care units between 2016 and 2018, and 102 027 (66.7 %) babies were born in private clinics. Further, 19 of the 21 NICUs (90.5 %) responded, and 28 of the 40 ART units (70 %) responded. The NICUs that participated in this survey had a total of 173 beds. The median number of beds in each NICU was 9 (range = 3–18).

**Women with worsening mental illness during the perinatal period**

A total of 82 women (52.8 per 10 000 births) were admitted to mental health care units during the perinatal period. There was a significant increase in the percentage of admissions across time. The number of admissions (n = 38) in 2018 (74.2 per 10 000 births) was approximately twice the number of admissions in 2016 (n = 19; 36.0 per 10 000 births) (Fig. 2, p < 0.001). Moreover, 32 out of 82 patients (39 %) in maternity care units were referred to psychiatric hospitals without maternity care units for hospitalization. Despite a deterioration in their mental illness, six patients were emergently admitted to maternity care units because they could not be admitted to mental health care units. Additionally, 10 patients had undergone legal abortion because of worsening mental illness across the three years of the survey.

**Multidisciplinary perinatal mental health care system**
Psychiatrists. Most MF centers and general hospitals had psychiatrists. The distributions were significantly different across the different types of units: MF centers, general hospitals, and private clinics (Fig. 3a, p < 0.01). However, only 4 MF centers (20.0 %) and 2 general hospitals (10.5 %) in Aichi prefecture reported that their psychiatrists were on duty for 24 hours a day to handle emergency admissions.

The 84 maternity care units did not have psychiatrists. Further, only 12 units (14.0 %) reported that they had contacted their patients’ psychiatrists from other medical facilities and provided care during the perinatal period. However, the other units (86 %) reported that they followed a policy that required patients to be referred to MF centers or general hospitals. Additionally, 34 units (43.0 %) reported that they sometimes provided care to patients who were stable and did not require medication.

Social workers.

Most MF centers and general hospitals had hospital social workers, and these distributions were significantly different across the different types of units (Fig. 3b, p < 0.01). The 76 maternity care units did not have any social workers. Further, only 12 units (16.0 %) reported that they collaborated with community social workers as an alternative.

With regard to seamless multidisciplinary collaboration between medical units and community health centers, 58 maternity care units (49.0 %) reported that they had encountered cases that required collaboration with a community health center. The corresponding percentages did not differ significantly across the different types of units (Fig. 3c, p = 0.549). The availability of social workers in these units was unrelated to the experience of seamless multidisciplinary collaboration (61.0 % vs. 52.0 %, p = 0.525). Among the units that had collaborated with a community health center, 57 units (98 %) reported that this approach was adopted seamlessly and without any problems.

Problems within the perinatal mental health care system

The respondents (21/118) provided a wide range of opinions in response to the following question: “What problems exist within the present perinatal mental health care system in Aichi prefecture?” Eleven respondents reported that the available perinatal mental health care resources were not adequate to permit them to emergently refer patients when their mental illness worsens. The other opinions that were shared were as follows: patient rejection of referrals to psychiatrists, poor medication adherence, and a lack of consensus regarding therapeutic protocols among obstetricians and psychiatrists.

Perspectives on psychotropic drug use during pregnancy among obstetricians
Table 1 summarizes the participating obstetricians’ perspectives on psychotropic drug use during pregnancy, when psychotropic drugs not contraindicated during pregnancy are prescribed. This variable was significantly associated with unit type ($p = 0.033$). Moreover, 5 %, 31.6 %, and 35.4 % of MF centers, general hospitals, and private clinics endorsed the discontinuation of drug use, respectively.

| Type of maternity care units | Psychotropic drug use during pregnancy | $p$ |
|-----------------------------|---------------------------------------|-----|
|                             | Discontinue                           | Continue | Other |
| MF center (n = 20)          | 1 (5.0)                               | 18 (90.0) | 1 (5.0) |
| General hospital (n = 19)   | 6 (31.6)                              | 13 (68.4) | 0 (0.0) |
| Private clinic (n = 79)     | 28 (35.4)                             | 45 (57.0) | 6 (7.6) |
| Total (n = 118)             | 35 (29.7)                             | 76 (64.4) | 7 (5.9) |

Values represent frequencies (percentages), and the $p$-value was computed using Fisher’s exact test. MF = maternal-fetal.

**NICU admission of infants born to mothers with mental illness**

Among the participating NICUs, 18 (95.0 %) had collected clinical data about maternal mental illness to care for their neonates. Among them, only 4 (21.0 %) had a policy that required them to prepare for the resuscitation of neonates born to mothers with mental illness. None of the 18 NICUs (95.0 %) had a policy that required neonates born to mothers who have been prescribed psychotropic drugs to be admitted to NICUs for toxicity evaluation. A total of 158 infants (1.0 per 1000 births; 50, 53, and 55 infants in 2017, 2018, and 2019, respectively) born to mothers with mental illness were admitted to NICUs during the survey period.

**Preconception counseling provided by fertility therapy centers**

To survey the preconception counseling services provided by fertility therapy centers, a questionnaire was sent to 40 ART units (Table 2). Between January and December 2017, the 28 ART units had recorded 3921 IVF, 7624 ICSI, and 13 192 FET treatment cycles. These treatment cycles accounted for approximately 4.3 %, 4.8 %, and 6.6 % of the total treatment cycles in Japan, respectively.
| Question                                                                 | Yes (%) | No (%) | A-1. Yes (%) | A-2. Yes (%) | B. Yes (%) | B. No (%) | C. Yes (%) | C. No (%) |
|-------------------------------------------------------------------------|---------|--------|--------------|--------------|------------|-----------|------------|-----------|
| 1. Have you collected any information about prior history of mental     | 28 (100.0) | 0 (0.0) | 6 (21.4)     | 22 (78.6)    |            |           |            |           |
| illness or associated complications from your patients through          |         |        |              |              |            |           |            |           |
| interviews (e.g., medical history)?                                     |         |        |              |              |            |           |            |           |
| A. Yes                                                                  |         |        |              |              |            |           |            |           |
| How do you collect them?                                                |         |        |              |              |            |           |            |           |
| A-1. Ask clients                                                        |         |        |              |              |            |           |            |           |
| A-2. Provided by clients                                               |         |        |              |              |            |           |            |           |
| B. No                                                                   |         |        |              |              |            |           |            |           |
| 2. Do you consult with psychiatrists before providing fertility         | 28 (100.0) | 0 (0.0) |              |              |            |           |            |           |
| treatment to clients who receive care from mental health hospitals or   |         |        |              |              |            |           |            |           |
| clinics?                                                                 |         |        |              |              |            |           |            |           |
| A. Yes                                                                  |         |        |              |              |            |           |            |           |
| When do you seek a consultation? (multiple options can be selected)     |         |        |              |              |            |           |            |           |
| A-1. Every case                                                         |         |        |              |              |            |           |            |           |
| A-2. Only cases with a prescription for mental illness                  |         |        |              |              |            |           |            |           |
| A-3. Only cases with very poor mental state                             |         |        |              |              |            |           |            |           |
| A-4. Other                                                              |         |        |              |              |            |           |            |           |
| B. No                                                                   |         |        |              |              |            |           |            |           |
| 3. Do you consult with psychiatrists before providing fertility         | 22 (78.6) | 6 (21.4) |              |              |            |           |            |           |
| treatment to a client who has a history of mental illness but is not   |         |        |              |              |            |           |            |           |
| receiving psychiatric care? (multiple options can be selected)          |         |        |              |              |            |           |            |           |
| A. Yes                                                                  |         |        |              |              |            |           |            |           |
| With which psychiatrist do you consult?                                 |         |        |              |              |            |           |            |           |
| A-1. Psychiatrist from a hospital that has maternal care and mental    |         |        |              |              |            |           |            |           |
| health care units                                                       |         |        |              |              |            |           |            |           |
| A-2. Psychiatrist who has previously provided care to my patients      |         |        |              |              |            |           |            |           |
| A-3. Other                                                              |         |        |              |              |            |           |            |           |
| B. No                                                                   |         |        |              |              |            |           |            |           |
| 4. To which obstetric facilities do you refer your clients with        | 19      | 4      |              |              |            |           |            |           |
| mental illnesses when they conceive? (multiple options can be selected) |         |        |              |              |            |           |            |           |
| A. Undecided                                                            |         |        |              |              |            |           |            |           |
| B. An MF center                                                         |         |        |              |              |            |           |            |           |
| C. A maternal care unit with one or more psychiatrists                 |         |        |              |              |            |           |            |           |
D. A hospital with a maternal care unit and a mental health care unit 4

E. Unknown 2

5. Are you aware of any hospital in Aichi that has a maternal care and mental health care unit?

|   |   | number |
|---|---|--------|
| A. Yes | 17 | (60.7) |
| B. No  | 11 | (39.3) |

MF = maternal-fetal.

All the 28 units that responded reported that they collected clinical information about the presence of mental illness from all patients and consulted with psychiatrists before providing fertility treatment to patients who regularly visited mental health care units. Sixteen institutes (57.1%) had a policy that required them to refer patients with a history of mental illness to a hospital that had both obstetricians and psychiatrists prior to conception. However, 23.0% of them did not consider it necessary to consult with a psychiatrist when a patient has a history of mental illness but is not receiving care from any mental health care unit. Some units (37.9%) reported that they did not have any information about hospitals that have adequate resources to provide appropriate perinatal care to such women (collaborative care provided by both obstetricians and psychiatrists). Further, 19 institutes (67.9%) reported that they did not discuss where their patients can receive appropriate care during the perinatal period with them prior to conception.

Policies regarding psychotropic drug use during pregnancy were also examined. Six units (21.4%) endorsed drug use discontinuation, and 18 units (64.3%) endorsed drug use continuation. The other 4 units selected other options.

The respondents (10/28) provided a range of opinions in response to the following question: “What problems have you encountered until now when you are providing fertility treatment to women with a history of mental illness?” Their responses were as follows: insufficient perinatal mental health care resources (n = 2), patient rejection of referrals to psychiatrists (n = 2), a lack of consensus regarding therapeutic protocols among obstetricians and psychiatrists (n = 2), and insufficient information about prior history of mental illness because it was provided by clients (n = 2).

Discussion

Main findings

This survey is the first to have examined obstetricians’ perspectives on psychotropic drug use among pregnant women in Japan. Among the surveyed obstetricians in private clinics, 35.4% endorsed drug use...
discontinuation. However, 90.0 % of those in MF centers endorsed drug use continuation. Their perspectives differed based on the type of maternity care unit in which they were working. With regard to fertility doctors, 21.4 % of ART units endorsed drug use discontinuation.

In this study, several problems within the perinatal mental health care system in Japan were identified. First, the number of admissions to mental health care units was 52.8 per 10 000 births, and there was an increase in this figure across time. Some patients were admitted to inappropriate units such as the following: psychiatric hospitals or maternal care units that are not equipped to provide specialized treatment for maternal mental illness. In response to an open-ended question, several maternity care units reported that there was a lack of perinatal mental health care resources to which patients can be referred. Second, 71.1 % and 64.4 % of the maternity care units did not have psychiatrists and social workers, respectively. The availability of these resources was significantly associated with maternity care units, and most private clinics did not have psychiatrists or social workers. Third, the number of neonates born to mothers with mental illness in NICUs was 1.0 per 1000 births. However, only a few of them evaluated neonatal toxicity caused by prenatal exposure. Finally, almost 40.0 % of the ART units reported that they do not have any information about hospitals that provide specialized perinatal mental health care. Further, 67.9 % of the units reported that they did not discuss where their patients can receive appropriate care during the perinatal period with them before providing fertility treatment.

**Interpretation of main findings**

A total of 102 027 babies (66.4 %) were born in private clinics. The high rate of occurrence of childbirths in private clinics is a distinguishing characteristic of the perinatal care system in Japan. These results underscore a potential risk factor. Specifically, many women with mental illnesses may be discouraged from continuing psychotropic drug use when they are found to be pregnant in maternity care centers in Japan. MF and tertiary centers endorsed the continued use of these drugs during the perinatal period (if necessary). However, clinicians in private clinics and ART units appeared to be more attuned to the potential risks of prenatal psychotropic medication exposure than those in MF centers. These perspectives depend on whether these units had psychiatrists and social workers. Most private clinics are not equipped with these resources. Therefore, decisions about psychotropic drug use and discontinuation during pregnancy should be carefully made on a case-by-case basis [7]. This decision-making process necessitates effective communication between psychiatrists, fertility doctors, and obstetrical physicians and discussions among them. Moreover, these discussions should be initiated when a patient expresses her wish to conceive. It has been reported that appropriate planning and intervention prior to pregnancy (e.g., preconception counseling including medication) can improve outcomes [9]. Fertility treatment affords one the opportunity to provide suitable interventions prior to conception. However, the present findings indicate that the provision of such interventions in ART units was limited. Therefore, such patients should consult perinatal mental health care experts prior to conception.
The present findings suggest that the available professional perinatal mental health care resources in Japan are insufficient. No special attention was paid to neonates born to mothers with mental illness, even though the adverse effects of maternal mental illness on neonates are well documented. Therefore, a professional perinatal mental health care center should be established in Japan. A single center study, examining this issue has reported to be a good model, which is not representative in Japan [13]. In Switzerland, the clinical trial to identify the problem and reform perinatal mental health care system has been recently started [14]. It is important to identify the issues related to the perinatal mental health care system and improve it in high-income countries.

**Strengths and limitations**

The present findings delineate obstetricians, neonatologists, and fertility doctors’ perspectives on the management of maternal mental illness in Japan. The response rates were high, and the survey was conducted across all types of maternity care units. These factors are likely to have minimized response bias. Second, the treatment policy of neonatologists was also collected in mothers with mental illness. Third, information about preconception care and counseling was collected from fertility doctors. This is the first survey to have examined fertility doctors’ perspectives on preconception care and counseling for women with mental illness in Japan.

The limitations of this study include the adoption of a questionnaire survey design. The clinical data of patients with mental illnesses were not collected. With regard to neonates born to mothers with mental illnesses, their prognosis could not be determined, and further research is needed to bridge this gap in the literature. We did not determine whether NICU admission was directly necessitated by maternal mental illness. However, past studies have found that NICU admission rates are higher among mothers with mental illnesses [15,16].

**Conclusions**

More physicians in private clinics endorsed drug use discontinuation than those in MF centers, even if that drug was not contraindicated during pregnancy. The available professional perinatal mental health care resources were perceived to be insufficient, and the preconception care provided by fertility treatment centers was limited. A perinatal mental health care center should be established to provide professional care to women with mental illnesses who wished to conceive in Japan.

**List Of Abbreviations**

NICU = neonatal intensive care unit

ART = assisted reproductive technology

MF = maternal-fetal
Declarations

Ethics approval and consent to participate

The Nagoya University Hospital Ethics Committee approved this retrospective study (approval number: 2018-0251) and waived the written informed consent requirement in accordance with the ethical guidelines of the Japanese Ministry of Health, Labor and Welfare. The participants were informed about the objectives of this study. Those who were unwilling to participate were excluded. The participants were free to skip questions that they did not wish to answer.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors’ contributions

KF, TKot, and YM contributed to the conceptualization and design of the study. KF and TKot conducted the statistical analyses. KF and TKot wrote the first draft of the manuscript. KF, TKot, and YM were
involved in data analysis and interpretation. TU, KI, TKob, NK, and TKan contributed to data interpretation and provided critical feedback throughout the preparation of the manuscript. TKot, FK, and HK critically reviewed the manuscript. All authors have read and approved the final manuscript.

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**Figures**

**Figure 1**

The system of maternity care units in Aichi prefecture. Most of maternity care was provided by private clinics.
Figure 1

The system of maternity care units in Aichi prefecture. Most of maternity care was provided by private clinics.
The annual number and prevalence of women who admitted to mental health care units during the perinatal period. The prevalence of admissions in 2018 (74.2 per 10 000 births) was approximately twice the prevalence of admissions in 2016 (36.0 per 10 000 births) (p < 0.001).
Figure 3

The difference of multidisciplinary perinatal mental health care resources across the different types of units: Maternal fetal (MF) centers, general hospitals, and private clinics. A. The distribution of psychiatrists. B. The distribution of hospital social workers. C. Experience of seamless multidisciplinary collaboration between medical units and community health centers.
Figure 3

The difference of multidisciplinary perinatal mental health care resources across the different types of units: Maternal fetal (MF) centers, general hospitals, and private clinics. A. The distribution of psychiatrists. B. The distribution of hospital social workers. C. Experience of seamless multidisciplinary collaboration between medical units and community health centers.