



Impact of a Psychiatric Nurse Specialist as a Liaison for Pregnant Women with Mental Disorders

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A number of scholarly reports have shown the importance of mental health care during pregnancy, especially for women with mental disorders. Nevertheless, the postpartum mortality rate due to mental disorders has been a serious issue in Japan. Therefore, since January 2015, our hospital has implemented a liaison system in which one psychiatric nurse specialist contributes to perinatal care. The aim of this study is to explore the impacts of a psychiatric nurse specialist as a liaison for pregnant women with mental disorders. More specifically, the investigation was retrospectively performed from January 2011 to December 2019 using medical records from a single university medical hospital in Japan. Participants comprised pregnant women with mental disorders. Of the 4,066 total deliveries completed during the study period, 152 women were detected as being exposed to the liaison system (2015-2019), while 92 were recognized as controls (2011-2014). We then conducted a comparative analysis between those who were exposed to the liaison system and the control group. Except for Apgar scores taken five minutes after birth, there were no intergroup differences in the patient characteristics or perinatal psychiatric outcomes. We found that the liaison system was associated with an increased rate of referral to the local public health center ($p = 0.003$). The system also significantly delayed the time at which patients first visited a psychiatrist because a psychiatric nurse could determine the urgency through interviews with the patients. Overall, our results suggest that the liaison system is helpful for pregnant women with mental disorders.

Keywords: liaison nurse; mental disorder; mental health care; pregnancy; psychiatric nurse specialist
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Introduction

Among all countries, Japan has the lowest rate of perinatal deaths, including neonates (Hasegawa et al. 2016; Wang et al. 2016). Therefore, Japan is considered one of the safest countries in the world for perinatal care. However, Japanese obstetricians were shocked by the results of one scholarly report which demonstrated that the one-year postpartum mortality rate was approximately three times higher for Japanese women when compared to rates in the United Kingdom and Sweden (Takeda 2016). This fact remained unknown for a long time due to the lack of statistical information. The same study also showed that

approximately 40% of maternal suicides were complicated by depression or schizophrenia, and that 60% of postpartum mothers who died by suicide also had mental disorders. Further, suicide was found to be the most frequent cause of late maternal death, followed by malignancy, heart disease, hemorrhage, amniotic embolization, and hypertensive disorders related to pregnancy (Takeda et al. 2017).

Given the background, Japanese obstetricians are holding serious discussions about the importance of mental health care during the perinatal period, especially for women with complications stemming from mental disorders. Various medical professionals are also coordinating their efforts to solve related issues. This includes collabora-

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tion among clinical nurses, midwives, social workers, and clinical psychologists, all of whom attend to perinatal mental health care concerns. In 2015, our hospital employed a psychiatric clinical nurse specialist as a liaison in the perinatal care context. Several reports have shown that these nurses may play important roles in the field of obstetrics (D’Afflitti 2005; Accortt and Wong 2017).

Although clinical nurse liaisons are considered important staff members in obstetrics, there is a lack of research on how they impact women in Japan during the perinatal period. Therefore, the aim of this study was to investigate the effects of a psychiatric nurse specialist as a liaison for pregnant women with mental disorders.

Materials and Methods

Ethical approval and data collection

This retrospective study was approved by the Ethics Committee at Shiga University of Medical Science (approval number R2020-011). The research was conducted at Shiga University of Medical Science using medical records compiled between January 2011 and December 2019. A liaison system operated by one senior psychiatric nurse specialist was implemented beginning in January 2015. Thus, we compared the data between before and after implementation. Baseline characteristics included patient data on age, parity, marital status, age of partner, feelings about the pregnancy (positive or negative), whether a psychiatric referral letter was obtained when first visiting the obstetrician, diagnoses of mental disorder, type of medications taken, and multiple/single/no drug medications. Outcomes were set as perinatal and psychiatric issues, including social support.

Liaison system

Pregnant women with mental disorders were often referred from other hospitals and clinics to the perinatal center at our university hospital because of the presence of obstetrics and psychiatric departments. Before the liaison system was implemented, obstetricians at our hospital directly referred women with these conditions to the in-house psychiatrist, particularly when they were in possession of referral letters from their original psychiatrists or in cases where the doctors otherwise suspected the presence of a mental disorder (Fig. 1A). However, once the system was implemented, obstetricians first referred these women to consult with the psychiatric nurse specialist, who thus acted as a liaison. In this capacity, the liaison nurse conducted interviews with pregnant women who were diagnosed with or suspected of having mental disorders; the nurse then decided when they would consult with the in-house psychiatrist based on their specific conditions (Fig. 1B). In the previous system, obstetricians or midwives could also directly refer these patients to local public health centers in order to receive social support. However, the liaison nurse also took on this role after the new system was implemented.

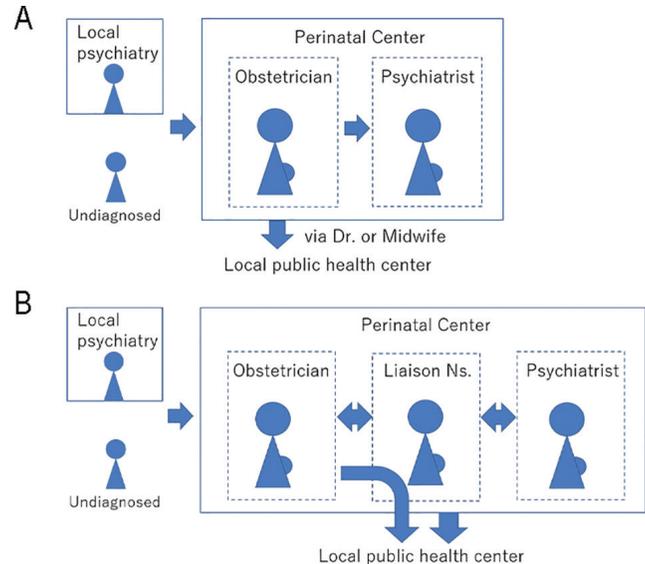


Fig. 1. Flowchart showing the referral system for pregnant women with mental disorders.

(A) prior to the liaison system; (B) liaison system.

Data analysis

All participants’ data were coded to protect their privacy and to maintain confidentiality. Statistical analyses were conducted using the GraphPad Prism software, version 7 (GraphPad Software, Inc., San Diego, CA, USA). Data distribution was evaluated using the D’Agostino-Pearson test, with values for age, gestational week, weight, Apgar scores in neonates, and pH in umbilical cord presented as medians (first quartile-third quartile), while other values were presented as percentages (%). Categorical data were compared via Fisher’s exact test. Comparisons between pregnant and non-pregnant patients were conducted using an unpaired two-tailed *t*-test, while the Mann-Whitney *U*-test was used for parametric and non-parametric data. Multivariate regression analysis was conducted to identify the factors associated with referral to the local public health center and gestational week upon first psychiatric visit. The explanatory variables were selected based on the results of univariate analysis and clinically important factors. JMP® 15 (SAS Institute Inc., Cary, NC, USA) was used for multivariate analysis. In all cases, statistical significance was determined at $p < 0.05$.

Results

A total of 4,066 deliveries were completed during the study period: 1,769 deliveries between 2011 and 2014 (pre-liaison period) and 2,297 deliveries between 2015 and 2019 (liaison period). Of the 1,769 pregnant women from the pre-liaison period, 92 (5.2%) with mental disorders were recognized as the control group. Of the 2,297 pregnant women from the liaison period, 152 (6.9%) with mental disorders were categorized as the liaison system group. There were no significant intergroup differences regarding baseline characteristics, such as age, age of partner, rate of

Table 1. Participant baseline characteristics.

Variables	Control group (n = 92)	Liaison system group (n = 152)	p value
Age (first-third quartile)	34 (30-38)	33 (28-36)	N.S.
Age of partner (first-third quartile)	35 (30-40)	35 (30-39)	N.S.
Primipara (%)	56 (60.8)	94 (61.8)	N.S.
Single marital status (%)	5 (5.4)	13 (8.5)	N.S.
Negative feeling (%) (unintended/termination attempts)	2 (2.2)	6 (3.9)	N.S.
Diagnosis			
Depression (%)	29 (31.5)	49 (32.2)	N.S.
Panic disorder (%)	25 (27.1)	39 (25.7)	N.S.
Schizophrenia (%)	13 (14.1)	24 (15.8)	N.S.
Bipolar disorder (%)	9 (9.8)	18 (11.8)	N.S.
Anxiety disorder (%)	6 (6.5)	13 (8.6)	N.S.
Eating disorder (%)	6 (6.5)	7 (4.6)	N.S.
Obsessive compulsive disorder (%)	2 (2.2)	5 (3.3)	N.S.
Other (dissociative disorder, dysthymia, adjustment disorder, somatic symptom disorder, borderline personality disorder)	9 (9.8)	15 (9.9)	N.S.
Type of medication			
Antianxiety drug (%)	37 (40.2)	59 (38.8)	N.S.
Antidepressant drug (%)	31 (33.6)	35 (23.0)	N.S.
Antipsychotic drug (%)	26 (28.2)	48 (31.5)	N.S.
Antiepileptic drug (%)	10 (10.8)	14 (9.2)	N.S.
Number of medications			
None (%)	32 (34.7)	63 (41.4)	N.S.
Single (%)	21 (22.8)	38 (25.0)	N.S.
Combination (%)	15 (16.3)	24 (15.7)	N.S.
More than three (%)	14 (15.2)	32 (21.0)	N.S.

N.S., not significant.

Table 2. Maternal and neonatal outcomes until one month after birth.

Variables	Control group (n = 92)	Liaison system group (n = 152)	p value
Cesarean delivery (%)	40 (43.4)	56 (36.8)	N.S.
Gestational weeks at delivery (first-third quartile)	38 (37-39)	38 (37-39)	N.S.
Birthweight (g) (first-third quartile)	2,834 (2,599-3,082)	2,857 (2,546-3,101)	N.S.
Apgar score (first-third quartile)			
Score at 1 min after birth	8 (8-9)	8 (8-8)	N.S.
Score at 5 min after birth	9 (9-9)	9 (9-9)	0.0387
pH of umbilical artery (first-third quartile)	7.302 (7.28-7.33)	7.294 (7.25-7.32)	N.S.
Neonatal admission to NICU (%)	22 (24.1)	34 (22.3)	N.S.
Congenital anomaly (%)	0 (0)	3 (1.9)	N.S.
Withdrawal syndrome of neonate (%)	6 (6.5)	6 (3.9)	N.S.
Breastfeeding (%)	64(70.0)	107 (70.4)	N.S.
Weight gain at one month after delivery (g) (first-third quartile)	967.5 (754-1,171)	1,008 (777-1,243)	N.S.

N.S., not significant.

primipara, marital status, and rate of negative feeling toward pregnancy (Table 1). Furthermore, there were no significant differences in mental disorder, type of medication, or number of medications (Table 1).

Except for Apgar scores taken five minutes after birth,

there were no significant intergroup differences in the maternal or neonatal outcomes (Table 2). However, we found significant intergroup differences in the referral rates to the local public health center and the gestational week upon first psychiatric visit ($p = 0.003$ and $p = 0.004$, respec-

tively) (Table 3).

Multivariate logistic regression analysis revealed a significant association between the liaison system and referral to the local public health center (odds ratio = 6.230; $p = 0.003$) (Table 4). Further, it showed a significant association between gestational week upon first psychiatric visit and the liaison period ($p = 0.002$) (Table 5).

Discussion

This study investigated the impacts of using psychiatric nurse specialists as liaisons for pregnant women with mental disorders. The implementation of the liaison system at the target hospital resulted in an increase in the rate of referral to the local public health center and delayed timing

Table 3. Impacts on regional support and psychiatry.

Variables	Control group (n = 92)	Liaison system group (n = 152)	p value
Referral to local public health center (%)	57 (62.0)	121 (80.0)	0.003
Gestational week upon first psychiatric visit (first-third quartile)	16 (11-28)	25 (18-32)	0.004
Admission to psychiatric ward (%)	14 (15.2)	20 (13.1)	N.S.

N.S., not significant.

Table 4. Multivariate logistic regression analysis on factors influencing referral to local health center.

Variables	Odds ratio	95% CI	p value
Age (years)	1.000	0.923-1.084	0.993
Primipara	2.408	1.009-5.747	0.048
Single marital status	4.319	0.324-57.555	0.268
Diagnosis			
Depression	1.984	0.514-7.659	0.320
Panic disorder	0.569	0.145-2.232	0.419
Schizophrenia	6.723	0.783-57.682	0.082
Bipolar disorder	5.595	0.409-76.631	0.197
Anxiety disorder	0.244	0.037-1.600	0.142
Eating disorder	2.318	0.307-17.486	0.415
Obsessive compulsive disorder	6.440	0.530-78.200	0.144
Others	3.218	0.501-20.692	0.218
Number of medication	1.730	1.187-2.521	0.004
Cesarean delivery	2.050	0.8264-5.083	0.122
Feeding with breast	0.432	0.137-1.365	0.153
Liaison system	6.230	1.853-20.916	0.003
Admission on psychiatric ward	1.200	0.368-3.919	0.762

Table 5. Multivariate linear regression analysis on factors influencing gestational weeks at first time visiting psychiatrist.

Variables	Regression coefficient	95% CI	p value
Age	-0.018	-0.299, 0.242	0.835
Primipara	-0.189	-3.247, -0.235	0.024
Single marital status	0.213	0.736, 5.922	0.012
Diagnosis			
Depression	-0.033	-2.390, 1.784	0.775
Panic disorder	-0.051	-2.843, 1.717	0.626
Schizophrenia	-0.097	-3.663, 1.428	0.387
Bipolar disorder	0.068	-2.049, 4.112	0.509
Anxiety disorder	0.036	-2.214, 3.396	0.678
Eating disorder	-0.017	-4.569, 3.713	0.838
Obsessive compulsive disorder	-0.003	-4.764, 4.622	0.976
Others	0.034	-2.710, 3.777	0.745
Number of medication	-0.183	-1.960, -0.065	0.037
Liaison system	0.266	0.873, 3.929	0.002

of the first psychiatric visit. Although there were significant differences to Apgar scores taken five minutes after birth, there is little clinical meaning to this result, as all scores (≥ 8 points) were in the normal range.

As mentioned, postpartum women with mental health issues may be referred to their local public health center. In these centers, they can receive continued support from public health nurses, particularly meaningful information related to public assistance, economic support, and child-care services. Several reports have shown the importance of social support in preventing suicidal ideation, postpartum depression, and child abuse (Morikawa et al. 2015; Kubota et al. 2020). In this regard, the liaison system was especially helpful.

In this study, patients in the liaison system waited significantly longer periods before being introduced to a psychiatrist. In the meantime, they were interviewed several times by the psychiatric nurse specialist, who determined the best time to introduce the patient to a psychiatrist. In urgent cases, the nurse referred patients to a psychiatrist on the same day as the interview. Therefore, delaying referral to a psychiatrist did not mean that it was disadvantageous to the patients. Before implementing the liaison system, obstetricians referred patients to a psychiatrist immediately because of the mere presence of a mental disorder, which burdened the psychiatrist. However, a psychiatric nurse specialist conducted detailed interviews and provided descriptions in the medical records. These descriptions were helpful for psychiatrists. From this point of view, we consider that the liaison system reduced the burden on psychiatrists. This system was possible because a psychiatric nurse has specialized knowledge and experience.

In Japan, all pregnant women are issued a maternity passbook (mother and child handbook) from the local public health office. This book contains records of maternal health condition, the growth and development of the infant, and vaccinations, until just before entering elementary school. However, there is little information on maternal mental health care. We recommend the inclusion of descriptions about mental health care in the maternity book to prevent maternal suicide.

This study had some limitations. First, the outcome was limited to short-term prognoses, which means that additional research is needed to investigate long-term prognoses such as child abuse. We believe that increased local and social support will improve long-term outcomes. Second, this study did not consider patient satisfaction owing to its retrospective nature. Apart from their role of liaison, the psychiatric nurse specialist also performed other roles in the obstetrics department, particularly by educating the obstetrics staff on mental health (D'Aflitti 2005). In other words, the obstetrics staff was largely unfamiliar with mental disorders. We therefore believe that patient satisfaction may increase through skill and knowledge improvements of departmental staff members.

Although Japan has the lowest rates of maternal and neonatal death in the world, its one-year post-delivery suicide rates have historically remained undisclosed. Today, obstetricians seek cooperation from a variety of other medical professionals in order to provide mental health care during the perinatal period. To the best of our knowledge, this was the first study to investigate the impact of a support system in which a psychiatric nurse specialist was employed as a liaison for pregnant women with mental health issues in Japan. In general, our findings suggest that such a system is ultimately beneficial for those patients.

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Conflict of Interest

The authors declare no conflict of interest.

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