Obstetric risk factors for depression during the postpartum period in South Korea: a nationwide study

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A R T I C L E   I N F O

A B S T R A C T

Objective: Postpartum depression is related to many adverse effects in both mothers and their children; therefore, proper screening and early interventions are needed. This study aims to identify the risk factors of postpartum depression. Our primary focus is on obstetric risk factors.
Methods: This study is a cross-sectional study which we extracted the data of women who gave birth between January 1st, 2010 and December 31st, 2012 from the Health Insurance Review and Assessment service (HIRA) database. We analyzed the data using multivariable logistic regression models.
Results: A total of 17,483 (1.4%) women suffered from depression during the postpartum period. Younger (< 20 years) and advanced maternal age (≥ 35 years), primiparity, previous depression, peripartum hysterectomy, uterine artery embolization, preterm delivery, placental abruption, cesarean delivery, induced labor, and preeclampsia were found to increase the likelihood of having depression after delivery.
Conclusions: Our findings suggest that there are several risk factors that lead women to postpartum depression. Therefore, early detection and well-management of the symptoms and risk factors for postpartum depression along with social support can help both physical and psychological conditions of women after childbirth.

1. Introduction

Women experience psychological and hormonal changes during pregnancy and childbirth [1]. This period is known as one of the most susceptible times to develop depression over the entire life of women [2,3]. The prevalence of postpartum depression (PPD) is estimated at 10–15%, but can range between 5.5% and 33.1% depending on studies, cultures, samples, and diagnostic criteria [4–7]. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), a specifier of 'with peripartum onset' encompasses only the first 4 weeks of postpartum [8]. However, many clinicians and researchers have recommended a broader timeframe, such as the first 6 to 12 months postpartum, because the symptoms of PPD can develop even after the first 4 weeks [9–11].

PPD is known to develop more likely with poor social support, previous depression/anxiety history, family history of psychiatric illness, previous abortion, substance abuse, discontinuation of breastfeeding, and marital relationship [12–16]. However, previous studies have reported conflicting results on some of the risk factors for PPD. For example, Silverman et al. reported that advanced maternal age increases the likelihood of PPD [17], however, Liu et al., on the other hand, reported that younger maternal age might contribute to PPD [18]. Robertson et al. found maternal age as a non-associative factor [12]. Likewise, in the case of cesarean delivery, some studies regarded it as a risk factor [19–21], while others did not [13,22]. There have been few studies on other obstetric risk factors such as placenta previa,

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placental abruption, and induced labor.

The consequences of PPD are linked to adverse effects in both mothers and their children [12,23–26]. PPD affects the marital relationship, quality of life, and mental health of mothers. It also influences children's emotional, behavioral, and cognitive development [23]. Furthermore, PPD has negative effects on mother-infant bonding as well [23]. Proper screening and early interventions are crucial in preventing these problems [27]. Most women visit obstetricians or gynecologists during their pregnancy and postpartum period on a regular basis [28]. Thus, the role of obstetricians and gynecologists is crucial for both mothers and infants.

Therefore, the aim of this study is to identify the obstetric risk factors of depression during the postpartum period. We also added previous depression as a variable, since previous depression has been known as a strong predictor of PPD [7,12,29]. Furthermore, we examined the timeframe from delivery to the first depression diagnosis during the postpartum period.

2. Methods

2.1. Data source

We extracted the data from the database of Korean National Health Insurance Service. South Korea has national health insurance system which covers all the health services, including admission, emergency room visit, ambulatory care, and pharmaceutical services of approximately 50 million Koreans. 97% of the population is enrolled in this service, and the remaining 3% is covered by Medical Aid Program [30]. Under these national health insurance systems, medical institutions in South Korea are required to submit all medical records to the Health Insurance Review and Assessment service (HIRA) database, with the exceptions of procedures that are not covered by insurance such as cosmetic surgery. The HIRA database adopted the diagnosis codes from the tenth revision of the International Classification of Diseases (ICD-10). We used these codes to identify the presence of depression (ICD-10 code, F32, 33) and the obstetric variables in women. We referred to ICD-10 code to define the presence of depression, regardless of methods, places, and duration of treatment.

2.2. Subjects

We extracted the data of 1,269,130 of women who gave birth from January 1, 2010 to December 31, 2012 from the HIRA database from September 1, 2016 to January 31, 2017. For those who had more than one pregnancy, we only included the information on their first pregnancy in our dataset.

2.3. Clinical information

Based on the stage of pregnancy, we classified the presence of depression into two categories: previous history of depression and depression during the postpartum period. In this study, women with 'previous history of depression' refer to those who had pursued depression treatment up until 1 year before childbirth. Depression during the postpartum period is defined as the depression diagnosis within the first year after delivery. In addition, we included previous history of depression, maternal age and parity (younger and advanced maternal age and primiparity), comorbidities and surgical intervention (preeclampsia, peripartum hysterectomy, and uterine artery embolization), delivery mode (cesarean delivery and induced labor), and obstetric complications (preterm delivery and placental abruption) as the variables. Our data did not contain any source of personal identification, as the information in the HIRA database was encrypted. This study was approved by the Institutional Review Board at Korea University Guro Hospital.

Table 1
Basic characteristics.

	Postpartum		p-value
	Non-PPD (n = 1,251,647)	PPD (n = 17,483)	
Age (years)[a]	30.86 SD:4.10	30.57 SD:4.60	< 0.0001**
< 20 years	9993 (0.8%)	208 (1.2%)	< 0.0001**
20-34 years	1,020,923 (81.6%)	13,577 (77.7%)	< 0.0001**
≥ 35 years[b]	220,731 (17.6%)	3698 (21.2%)	< 0.0001**
Primiparity[b]	697,027 (55.7%)	9348 (53.5%)	< 0.0001**
Multiple pregnancy[b]	19,633 (1.6%)	315 (1.8%)	0.0138**
Cesarean delivery[b]	455,485 (36.4%)	7699 (44.0%)	< 0.0001**
Induced labor[b]	292,660 (23.4%)	3843 (22.0%)	< 0.0001**
Preeclampsia[b]	33,219 (2.7%)	592 (3.4%)	< 0.0001**
Gestational diabetes mellitus[b]	39,137 (3.13%)	1606 (9.2%)	< 0.0001**
Placenta previa[b]	11,689 (0.9%)	214 (1.2%)	< 0.0001**
Placental abruption[b]	4789 (0.4%)	111 (0.6%)	< 0.0001**
Preterm delivery[b]	36,501 (2.9%)	795 (4.6%)	< 0.0001**
Uterine artery embolization[b]	1129 (0.1%)	33 (0.2%)	< 0.0001**
Peripartum hysterectomy[b]	1285 (0.1%)	50 (0.3%)	< 0.0001**
Previous depression[b]	18,716 (1.5%)	3692 (21.1%)	< 0.0001**

PPD = Postpartum depression.
[a] Independent *t*-test.
[b] Pearson's Chi-square test.
** *p* < 0.01.

2.4. Statistical analysis

Differences in continuous and categorical variables according to depression history during the postpartum period were analyzed with the independent *t*-test and Pearson's Chi-square test, respectively. Multivariable logistic regression analyses were performed to determine the risk factors for depression during the postpartum period. A *p* value of < 0.05 was considered statistically significant. All statistical analyses were performed using the Statistical Package for Social Sciences (Version 18.0 for Windows).

3. Results

A total of 17,483 (1.4%) women had depression during the postpartum period. The mean age of women with depression was 30.57 (SD = 4.60), while the mean age of women without depression was 30.86 (SD = 4.10). Table 1 shows the basic characteristics of the subjects. Fig. 1 shows the timeframe from delivery to the first depression diagnosis during the postpartum period. The result from our study indicates that the number of women who are diagnosed with depression keeps increasing from the first month up to 1 year after delivery.

The risk factors for depression during the postpartum period were assessed using multivariable logistic regression analyses. Previous history of depression had the highest level of relative risk (OR, 16.72; 95% CI, 16.05–17.41). Likewise, younger (< 20 years)/advanced maternal age (≥ 35 years) and primiparity also increased the risk for depression during the postpartum period (Table 2). Among comorbidities and surgical interventions, preeclampsia, peripartum hysterectomy, and uterine artery embolization contributed to PPD, whereas gestational diabetes mellitus did not. Delivery mode was another risk factor. Both cesarean delivery and induced labor were found to increase the likelihood of the prevalence of PPD. In terms of obstetric complications, PPD was more likely to develop in women who had experienced preterm delivery or placental abruption, whereas it had no significant association in women who had experienced placenta previa.