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Research paper

The synergistic effect of breastfeeding discontinuation and cesarean section delivery on postpartum depression: A nationwide population-based cohort study in Korea

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ABSTRACT

Background: The relationships between breastfeeding discontinuation and cesarean section delivery, and the occurrence of postpartum depression (PPD) remain unclear. Therefore, we aimed to investigate the association of breastfeeding discontinuation and cesarean section delivery with PPD during the first 6 months after delivery.
Methods: Data were extracted from the Korean National Health Insurance Service-National Sample Cohort for 81,447 women who delivered during 2004–2013. PPD status was determined using the diagnosis code at outpatient or inpatient visit during the 6-month postpartum period. Breastfeeding discontinuation and cesarean section delivery were identified from prescription of lactation suppression drugs and diagnosis, respectively. Cox proportional hazards models were used to calculate adjusted hazard ratios.
Results: Of the 81,447 women, 666 (0.82%) had PPD. PPD risk was higher in women who discontinued breastfeeding than in those who continued breastfeeding (hazard ratio = 3.23, $P < 0.0001$), in women with cesarean section delivery than in those with vaginal delivery (hazard ratio = 1.26, $P = 0.0040$), and in women with cesarean section delivery who discontinued breastfeeding than in those with vaginal delivery who continued breastfeeding (hazard ratio = 4.92, $P < 0.0001$).
Limitations: Study limitations include low PPD incidence; use of indirect indicators for PPD, breastfeeding discontinuation, and working status, which could introduce selection bias and errors due to miscoding; and potential lack of adjustment for important confounders.
Conclusions: Breastfeeding discontinuation and cesarean section delivery were associated with PPD during the 6-month postpartum period. Our results support the implementation of breastfeeding promoting policies, and PPD screening and treatment programs during the early postpartum period.

1. Introduction

Postpartum depression (PPD), the most common complication of childbearing, affects approximately 13–19% of mothers during the first 6 months after delivery (O'Hara and McCabe, 2013). PPD can have a negative impact on maternal health as well as infant health and development (Galler et al., 1999; Minkovitz et al., 2005; Paulson et al., 2006; Turner et al., 2003). Thus, PPD is a serious problem; however, records indicate that only approximately 1% of mothers in Korea have been diagnosed and treated for PPD (Dong Woo Lee, 2015). This likely occurs because negative perceptions about mental health problems and the fear of social stigmatization cause individuals with psychological disorders to conceal their symptoms (Pinto-Foltz and Logsdon, 2008; Rahman et al., 2013). Because of the potential tragic consequences of PPD for the mothers and infants, it is crucial to identify risk and protective factors for PPD.

Breastfeeding has important benefits for maternal and infant health, with previous studies suggesting that breastfeeding may offer protective benefits against PPD (Mezzacappa and Katkin, 2002; Figueiredo et al., 2014). Mothers who do not breastfeed have an increased risk for type 2 diabetes mellitus, breast and ovarian cancer, and PPD (Ip et al., 2009). Furthermore, infants who are breastfed have a reduced risk of gastrointestinal infections, respiratory tract infections, asthma, and obesity, and the development of diabetes later in life (Kramer et al., 2003;

Abbreviations: CI, confidence interval; CS, cesarean section; HR, hazard ratio; NHIS-NHC, National Health Insurance Service-National Sample Cohort; PPD, postpartum depression

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Bhandari et al., 2003; Chantry et al., 2006). Therefore, the UN and UNICEF recommend early initiation of breastfeeding within 1 h of birth, and exclusive breastfeeding for the first 6 months of life (World Health Organization, 2016). Several previous studies have indicated that both no breastfeeding and early discontinuation of breastfeeding are associated with PPD (Watkins et al., 2011; Figueiredo et al., 2014; Hatton et al., 2005; Taveras et al., 2003). In contrast, other studies found that PPD occurred prior to discontinuation of breastfeeding (Seimyr et al., 2004, McLearn et al., 2006, Dennis and McQueen, 2007, Pippins et al., 2006, Dennis and McQueen, 2009). Thus, although the relationship between breastfeeding and PPD has been investigated in numerous studies, the nature of this relationship and the mechanism underlying it remains equivocal (Pope and Mazmanian, 2016; Figueiredo et al., 2014, Dennis and McQueen, 2009).

Cesarean section (CS) delivery is another well-known risk factor for PPD. However, the relationship between CS and PPD remains controversial. CS has been found to be both a significant risk factor for PPD (Fisher et al., 1997; Green et al., 1990) and a protective factor against PPD (Chaaya et al., 2002). In contrast, some studies have found no significant association between CS and PPD (Carter et al., 2006; Eisenach et al., 2008; Josefsson et al., 2002). Several researchers have reported that, compared with vaginal delivery, CS delivery is associated with a decreased breastfeeding rate (Zanardo et al., 2010; Cakmak and Kuguoglu, 2007), and as mentioned previously, discontinuing breastfeeding can increase the risk of PPD; however, the precise interrelationships among mode of delivery, breastfeeding status, and PPD remain to be elucidated.

Korea has one of the highest recorded CS rates among countries in the Organization for Economic Co-operation and Development (Organization for Economic Co-operation and Development, 2015). This might be because of increased high-risk pregnancies due to an increase in the rates of late marriage and late first childbirth, possibly caused by the increased participation and productivity of women in the workforce during recent decades (Cho et al., 2011). Furthermore, women who have to go back to their full-time jobs might be at higher risk for early discontinuation of breastfeeding, possibly making them more vulnerable to PPD (Taveras et al., 2003); however, there is little evidence of any such association. Therefore, the present population-based cohort study investigated the relationship between early discontinuation of breastfeeding and CS, and PPD in Korean women. Moreover, we analyzed the role of patients' working status in the association between early discontinuation of breastfeeding and CS, and PPD.

2. Methods

2.1. Study participants and data collection

Data were obtained for the 2002–2013 period from the Korean National Health Insurance Service-National Sample Cohort (NHIS-NSC), which includes information on approximately 1 million Koreans since 2002. The NHIS-NSC offers nationally representative cohort data on the entire Korean population, which can be used to track patient and clinical characteristics over time, reveal epidemiological causes of diseases, and develop health policies. The NHIS-NSC used a 2.5% (n = 1,025,340) stratified random sampling method, including age, sex, residence, health insurance type, family income decile, and individual total medical costs in 2002. Data included the unique de-identified numbers of the patients, age, sex, types of insurance, diagnoses according to the International Classification of Diseases (ICD-10), medical costs, procedures, and prescribed drugs. In addition, the unique de-identified numbers were linked to mortality information from the Korean National Statistical Office.

We performed a cohort study of women who delivered between 2004 and 2013. We evaluated prenatal depressive disorders in the 266 days before the day of delivery, and assessed depressive disorders before pregnancy in the one year period before the first gestation day. Accordingly, we excluded women who delivered in 2002 or 2003, and included only women who delivered in or after 2004 in order to a wash out period of at least two years' time. We selected 81,447 women who delivered either vaginally or by CS between 2004 and 2013. The NHIS data included the exact childbirth date; we subtracted 266 days from the day of childbirth to yield the first day of pregnancy. This study adhered to the tenets of the Declaration of Helsinki, and the study design was reviewed and approved by the ethics board of the Graduate School of Public Health in Yonsei University (2-1040939-AB-N-01-2016-332).

2.2. Postpartum depression and follow-up

The outcome variable for this study was PPD. We defined PPD as newly diagnosed bipolar affective disorder (ICD-10: F31), depressive episode (F32), recurrent depressive disorder (F33), persistent mood disorders (F34), other mood disorders (F38), unspecified mood disorder (F39), mixed anxiety and depressive disorder (F41), or mental disorder associated with puerperium (F53), if the women had either outpatient or inpatient visits at least once within the first six months after delivery. PPD incidents occurred when women who delivered between January 1, 2004 and December 31, 2013 had the first PPD diagnosis within six months after parturition, or upon death.

2.3. Breastfeeding discontinuation

Breastfeeding discontinuation was identified from the prescription drug records in the claim data. A woman was considered to have discontinued breastfeeding if she had at least one or more prescriptions for lactation suppression (bromocriptine) filled during the first 12 weeks after delivery.

2.4. Mode of delivery

Mode of delivery was identified from the visit records in the claim data. We included women who had vaginal or CS delivery using ICD-10 (O80-O84) and EDI code.

2.5. Covariates

Demographic factors such as maternal age, income level, and residential area were included as covariates in our analysis. Working status indicated that the medical insurance subscribers were working and that the subscribers' dependents were not working. Obstetric history included the number of delivery experiences and twin birth status. Obstetrical complications included severe perineal laceration during delivery (O703, O704), other obstetric trauma (O70), postpartum hemorrhage (O72), puerperal sepsis (O85), infection of obstetric surgical wound (O860), venous complication in puerperium (O870, O871, O873, O878, O879), obstetric embolism (O88), complication of anesthesia during the puerperium (O89), complication of the puerperium (O90), and other maternal diseases (O98, O99). Maternal comorbidities during pregnancy included pre-existing hypertension (O10), gestational hypertension, pre-eclampsia or eclampsia (O11, O13, O14, O15, O16), gestational diabetes mellitus (O24), abnormal findings or suspected fetal problems (O28, O35, O36), premature rupture of membranes (O42), placental disorders (O43), placenta praevia (O44), and premature separation of the placenta (O45). Depression-related factors, such as prenatal depressive disorder, depressive disorder before pregnancy, and use of antidepressants such as sertraline, paroxetine, fluoxetine, and citalopram during the first 12 weeks after delivery, were included.