



Original article

# Maternal Morbidities and Postpartum Depression: An Analysis Using the 2007 and 2008 Pregnancy Risk Assessment Monitoring System


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## ABSTRACT

**Purpose:** Postpartum depression (PPD) is common and associated with significant health outcomes and other consequences. Identifying persons at risk may improve screening and detection of PPD. This exploratory study sought to identify the morbidities that associate with 1) PPD symptoms and 2) PPD diagnosis.

**Methods:** Data from the 2007 and 2008 Pregnancy Risk Assessment Monitoring System were analyzed from 23 states and 1 city ( $n = 61,733$  pregnancies); 13 antenatal morbidities were included. To determine whether antenatal morbidity predictors of PPD would differ based on PPD symptoms versus a diagnosis, each of the 13 antenatal morbidities were examined in separate logistic regression models with each PPD outcome. For each objective, two samples were examined: 1) Women from all states and 2) women from Alaska and Maine, the two states that included both PPD symptoms and PPD diagnosis measures in their questionnaires. Control variables included demographic and socio-demographic variables, pregnancy variables, antenatal and postpartum health behaviors, and birth outcomes.

**Main Findings:** Having vaginal bleeding (odds ratio [OR], 1.42; OR, 1.76), kidney/bladder infection (OR, 1.59; OR, 1.63), nausea (OR, 1.50; OR, 1.80), preterm labor (OR, 1.54; OR, 1.51), or being on bed rest (OR, 1.34; OR, 1.56) associated with both PPD symptoms and PPD diagnosis, respectively. Being in a car accident associated with PPD symptoms only (OR, 1.65), whereas having hypertension (OR, 1.94) or a blood transfusion (OR, 2.98) was associated with PPD diagnosis only. Among women from Alaska or Maine, having preterm labor (OR, 2.54, 2.11) or nausea (OR, 2.15, 1.60) was associated with both PPD symptoms and PPD diagnosis, respectively. Having vaginal bleeding (OR, 1.65), kidney/bladder infection (OR, 1.74), a blood transfusion (OR, 3.30), or being on bed rest (OR, 1.87) was associated with PPD symptoms only, whereas having diabetes before pregnancy (OR, 5.65) was associated with PPD diagnosis only.

**Conclusions:** The findings of this exploratory study revealed differences in the antenatal morbidities that were associated with PPD symptoms versus diagnosis in both samples, and can assist prenatal care providers in prioritizing and screening for these morbidities that are associated with PPD during pregnancy. Additional research is warranted to confirm the results of this study in other samples and populations. Developing strategies to 1) improve general awareness of PPD and the appropriate antenatal morbidity risk factors to focus on in clinical settings, and 2) increase screening for the antenatal morbidities determined to be predictors of PPD in this study are warranted in preventing PPD.

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Among women who are in their childbearing years, depression can be one of the most disabling disorders (O'Hara, 2009). Postpartum depression (PPD), a mood disorder that can occur during the first year after childbirth (Epperson, 1999), is known to be a very common illness, and affects approximately one in every eight mothers to a point that affects her ability to carry out her maternal responsibilities (Butler & Lambert, 2010; Wisner,

Parry, & Piontek, 2002). PPD is divided into three categories: 1) The blues, which affect roughly 50% to 80% of new mothers and is considered to be normal, 2) nonpsychotic PPD, which affects roughly 10% to 15% of new mothers, with the incidence being on average 13%, and 3) postpartum psychosis, which is rarer than the other two types and occurs in roughly one or two out of every thousand pregnancies (Evans & Theofrastous, 1997; Miller, 2002; Negus Jolley & Betrus, 2007; O'Hara & Swain, 1996).

Among depressive disorders, PPD is particularly important because this disorder can affect a woman's parenting practices, which can impact the well-being of the baby (O'Hara, 2009). For example, mothers with PPD may be unresponsive to their infants (or portrayed as being unresponsive); withdraw from, avoid, or neglect their infants; or display behaviors toward their infants that are passive, intrusive, and aggressive, (Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Reck et al., 2004). Long-term consequences of PPD include recurrent episodes of depression (Miller, 2002; Robertson, Celasun, & Stewart, 2003), greater health care costs and utilization compared with nondepressed women (Dagher, McGovern, Dowd, & Gjerdingen, 2012; Petrou, Cooper, Murray, & Davidson, 2002), having children at higher risk for depression (Goodman, 2007; Murray et al., 2009), and having children with difficult temperament and other behavioral problems (Bruder et al., 2007; Goodman & Tully, 2006; Hanington, Ramchandani, & Stein, 2010). Thus, it is imperative to identify the factors that increase a woman's risk for PPD, and/or treat PPD accordingly, because 1) PPD can potentially jeopardize a woman's future health, and 2) the relationship between a mother and baby is crucial for healthy maternal and child health outcomes.

PPD is characterized by a variety of symptoms including mood swings, fatigue, fear, sadness and despair, anxiety, thoughts of compulsion, loss of libido, inconsistent sleeping patterns, and feelings of inadequacy (Horowitz, Damato, Solon, von Metzsch, & Gill, 1995). When these symptoms reach a level of intensity that begins to affect the well-being of a woman and her daily functioning, this may indicate PPD, and a woman should seek treatment. Because a new mother may be unaware of 1) the normal physical changes that occur after giving birth, and 2) her ability to care for her infant, approximately 4 to 6 weeks after the delivery, the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists recommend that a woman should seek a postpartum examination through her physician; this examination should include an evaluation of her current health status, her adaptation to caring for her infant, and a formal assessment for depressive symptoms using instruments with known sensitivity and specificity (American Academy of Pediatrics & the American College of Obstetrics & Gynecologists, 2007; Epperson, 1999; Fetchner-Bates, Coyne, & Schwenk, 1994). Although the Edinburgh Postnatal Depression Scale is the most commonly used tool in screening for PPD, and the sensitivity and specificity have been demonstrated (Gibson, McKenzie-McHarg, Shakespeare, Price, & Gray, 2009), there remains a need to address whether discrepancies exist between self-reported PPD symptoms and PPD diagnosis (e.g., women who are not diagnosed in the presence of symptoms, women who are diagnosed in the absence of symptoms).

A variety of risk factors have been identified for PPD, including demographic and sociodemographic factors (e.g., age, socioeconomic status, marital status), exposures to difficult surroundings (e.g., domestic violence), preexisting mental/mood states (low self-esteem, history of depression and/or anxiety), and characteristics of the infant (e.g., difficult temperament;

Appolonio & Fingerhut, 2008; Beck, 2001; Misri & Kostaras, 2002). Although a myriad of risk factors are well-documented in the literature, the extent to which morbidities present during pregnancy act as risk factors for predicting PPD remains unclear. Although pregnancy is often viewed as a special, joyous time in a woman's life, experiencing morbidities and complications resulting from those morbidities (e.g., preeclampsia, gestational diabetes, hemorrhage) may have a significant impact on the well-being of the woman (Hamilton & Lobel, 2008; Hueston & Kasik-Miller, 1998; Misra & Grason, 2006). Thus, it is crucial to promptly diagnose and treat such morbidities as well as understand any psychological implications that can result from undiagnosed and untreated morbidities.

Numerous studies have demonstrated the association between physical morbidities and mental illness over time and across different age groups (Aneshensel, Frerichs, & Huba, 1984; Geerlings, Beekman, Deeg, & Van Tilburg, 2000; Goldberg, 2010; Gunn et al., 2012; Lewinsohn, Seely, Hibbard, Rohde, & Sack, 1996; Smit, Beekman, Cuijpers, de Graaf, & Vollebergh, 2004). Among women in their reproductive years, most studies have examined either the link between 1) physical health problems after childbirth and poorer mental health outcomes (e.g., PPD, poorer emotional health; Brown & Lumley, 2000; Webb et al., 2008; Woolhouse et al., 2014), and/or 2) having general pregnancy and/or delivery complications and PPD (Forman, Videbeck, Hedegaard, Salvig, & Secher, 2000; O'Hara & Swain, 1996; Warner, Appleby, Whitton, & Faragher, 1996). Regarding specific antenatal morbidities, only diabetes, gestational diabetes (Kozhimannil, Pereira, & Harlow, 2009) and preeclampsia (Duley, 2009) have been associated with PPD; however, these studies were based on small sample sizes on women receiving Medicaid in New Jersey, and Dutch women, respectively. Apart from these three conditions, given the multitude of morbidities that pregnant women can experience, there remains a need to identify whether there are additional antenatal morbidities that act as risk factors for predicting PPD. By identifying these specific morbidities that associate with PPD, 1) physicians can ideally focus on early identification and diagnosis of these morbidities, and 2) additional medical attention can be provided in treating women who are experiencing these morbidities, minimizing complications and potentially lowering their odds of PPD.

The objectives of this study, which was exploratory in nature, were to examine the associations between a variety of antenatal morbidities and PPD among 1) women with self-reported PPD symptoms and 2) women with a PPD diagnosis by a health care professional, using a national, stratified, random sample of women in the United States. By using an exploratory study design, a better understanding of antenatal morbidities acting as potential risk factors for PPD symptoms and/or diagnosis can be attained.

## Methods

Written institutional review board approval was received from the authors' institution for this study. All data were de-identified.

## Data

This study used data from the 2007 and 2008 Pregnancy Risk Assessment Monitoring System (PRAMS). PRAMS is a continuing, national, population-based survey maintained by the U.S. Centers for Disease Control and Prevention, and collects state-specific

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