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Policy matters

Reevaluating the Relationship Between Prenatal Employment and Birth Outcomes: A Policy-Relevant Application of Propensity Score Matching

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A B S T R A C T

Background: Prior research shows an association between prenatal employment characteristics and adverse birth outcomes, but suffers methodological challenges in disentangling women's employment choices from birth outcomes, and little U.S.-based prior research compares outcomes for employed women with those not employed. This study assessed the effect of prenatal employment status on birth outcomes.
Methods: With data from the Listening to Mothers II survey, conducted among a nationally representative sample of women who delivered a singleton baby in a U.S. hospital in 2005 ($n = 1{,}573$), we used propensity score matching to reduce potential selection bias. Primary outcomes were low birth weight (<2,500 g) and preterm birth (gestational age <37 weeks). Exposure was prenatal employment status (full time, part time, not employed). We conducted separate outcomes analyses for each matched cohort using multivariable regression models.
Findings: Comparing full-time employees with women who were not employed, full-time employment was not causally associated with preterm birth (adjusted odds ratio [AOR], 1.37; $p = .47$) or low birth weight (AOR, 0.73; $p = .41$). Results were similar comparing full- and part-time workers. Consistent with prior research, Black women, regardless of employment status, had increased odds of low birth weight compared with White women (AOR, 5.07; $p = .002$).
Conclusions: Prenatal employment does not independently contribute to preterm births or low birth weight after accounting for characteristics of women with different employment statuses. Efforts to improve birth outcomes should focus on the characteristics of pregnant women (employed or not) that render them vulnerable.

Introduction and Background

Employment during pregnancy and the postpartum period is increasingly common: 67% of first-time mothers report being employed during their pregnancies, and 87% of these women worked outside the home into their last trimester. In comparison, 44% of women were employed during pregnancy in the 1960s (Johnson, 2008). Postpartum employment shows similar historical trends: In 2010, 55% of all mothers of infants were employed, up from 38% in 1980 (U.S. Census Bureau, 2010).

The prevalence of preterm birth (<37 weeks gestation) has increased 35% since 1981, from 9.4% to 12.7% in 2007. More than 40% of preterm infants are born at low birth weight (<2,500 g), and the prevalence of low birth weight has also increased 24% over this time period (Martin et al., 2010). In recent years, rates have begun a slight decline, but reducing preterm birth and low birth weight remain a focus of policy and research (Bock & Miller, 2012; U.S. Department of Health and Human Services, 2010; Preterm Birth Projects, 2012). Although the etiology of preterm birth and low birth weight has not yet been fully characterized, associated factors include previous preterm birth, infection or inflammation, vascular disease, uterine overdistension, multiple pregnancies, periodontal disease, low maternal body mass index, indicated preterm births (e.g., for preeclampsia, eclampsia, and intrauterine growth restriction), and Black race (Goldenberg, Culhane, Iams, & Romero, 2008). Additionally, iatrogenic

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prematurity is a real concern, because early elective deliveries are associated with health problems for both mothers and infants (Angood et al., 2010; Ashton, 2010; Tita et al., 2009). Given recent changes in the workforce participation of pregnant women and mothers, characterizing the influence of employment on childbirth-related health is relevant for families, employers, insurers, health care providers, and for the government and private sector systems that support the care and well-being of mothers and children.

The theoretical model underlying this analysis (Figure 1) is a hybrid model of workforce participation and health adapted from Becker (1965) and Grossman (1972). The model has health, broadly defined, as the outcome, and assumes that health is determined by genetic endowment, other preexisting factors, and personal choices. This theoretical model has successfully been applied to the study of women's workforce participation and perinatal health (McGovern et al., 2006). In the model, birth outcomes are explained not only by maternal health status, medical factors, socioeconomic circumstances, and demographics, but also by employment choices. The model allows for both a direct association between pre-pregnancy factors and birth outcomes (pathway A) and an indirect association via pregnancy-related choices, including employment (pathway B). Employment may influence birth outcomes either generally (whether women are employed or not) or in specific ways, depending on the amount of employment (part time vs. full time) or other factors, including employment conditions and exposures.

Prior research on the general impact of employment on birth outcomes has been limited, has conflicting results, and much of it is either decades old or was conducted in a non-U.S. context. Recent studies in European countries have found that employment during pregnancy had no impact on outcomes such as preterm birth and low birth weight (Jansen et al., 2012; Saurel-Cubizolles et al., 2004). Some U.S. studies, however, have found that women employed during pregnancy are more likely to experience adverse birth outcomes compared with women not employed during pregnancy (Mercer et al., 1996; Naeye & Peters, 1982). There is even less information on the differential impact of full-time versus part-time employment on pregnancy outcomes. However, an analysis of participants of the Nurses' Health Study II found that part-time employment was associated with a lower risk of preterm birth, compared with full-time maternal employment (Lawson et al., 2009). Although not the focus of the present paper, research suggests that specific employment and occupational characteristics are associated with low birth weight and preterm birth, such as high physical demands and long work hours (Bell, Zimmerman, & Diehr, 2008; Bonzini, Coggon, & Palmer, 2007; Peoples-Sheps et al., 1991; Teitelman, Welch, Hellenbrand, & Bracken, 1990).

Although prior research on predictors of poor birth outcomes among employed women is extensive, much of it suffers a methodological challenge in identifying a causal relationship between prenatal employment and birth outcomes. This same challenge is present in the more limited extant literature comparing birth outcomes for employed women compared with those who are not employed, which generally relies on multivariable regression for this purpose. Researchers have noted the issue of selection bias and the consequent difficulty in obtaining unbiased estimates of the impacts of maternal choices and behaviors on health outcomes owing to differences in unmeasured characteristics associated with both the choice or behavior and the outcome of interest (Baker & Milligan, 2008). In other words, it is very difficult to disentangle a woman's employment choices from her birth outcomes given that both may be influenced by factors that are not easily measured or are unavailable in many data sets (e.g., maternal or professional identity, financial or emotional stress, social support, and motivation).

This analysis aims to contribute to the literature on the impact of workforce participation on birth outcomes and to address the methodological challenges of analyzing outcomes for groups of women with disparate characteristics. This study reexamines the relationship between prenatal employment and birth outcomes by isolating the potential causal impact of full-time, part-time, or no employment during pregnancy, independent of other factors, on preterm birth and low birth weight. We minimize the role of selection bias by using propensity score matching methods.

Methods

Data and Study Population

Data came from the *Listening to Mothers* series of nationally representative surveys, which collect information from women

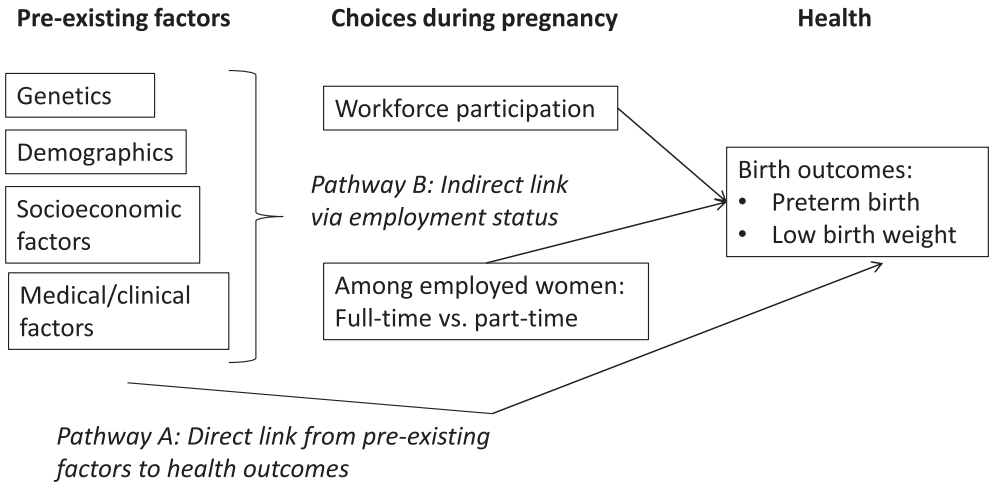

Figure 1. Model of the relationship between preexisting factors, workforce participation during pregnancy, and birth outcomes.