

Research BRIEF

Research to Improve the Nation's Health System

2017 . No. 3

EVALUATING THE IMPACT OF THE LABORIST MODEL OF OBSTETRIC CARE ON MATERNAL AND NEONATAL OUTCOMES

Sindhu K. Srinivas, Dylan S. Small, Michelle Macheras, Jesse Y. Hsu, Donna Caldwell, and Scott Lorch

American Journal of Obstetrics & Gynecology, December 2016

KEY FINDINGS

Hospitals that implement a laborist model of obstetric care have a reduced rate of labor induction and preterm births without adverse effects on other outcomes.

THE QUESTION

Introduced over a decade ago, the laborist model of obstetric care is a growing alternative to the traditional model of care. In the traditional model, the provider follows the woman throughout her pregnancy and delivery, but may have conflicting clinical duties at the time of labor. In the laborist model, a hospital-employed provider staffs the labor and delivery unit without any competing clinical duties. The laborist model shifts the way patients and providers experience obstetric care, but its effectiveness is unproven. It may enhance maternal and neonatal safety, but may also increase handoffs and decrease patient satisfaction. This study evaluates the impact of the laborist model on maternal and neonatal outcome measures.

THE FINDINGS

The authors studied nearly 550,000 women delivering at 24 hospitals, eight of which implemented laborist models within the previous three years and 16 of which have traditional models. Hospitals were matched by teaching status, volume of deliveries, geographic area, and NICU level.

After controlling for other factors, the study found that implementation of the laborist model was associated with a 15% decrease in the odds of the induction of labor and a 17% decrease in the odds of preterm birth (less than 37 weeks). Looking further, these decreases were evident for spontaneous preterm birth, but not medically indicated preterm birth. There was no significant difference in rates of delivering very low birthweight infants (less than 1500 grams) or low birthweight infants (between 1500 and 2500 grams). As the table shows, neonatal outcomes did not differ between laborist and nonlaborist hospitals.

EFFECT OF IMPLEMENTING A LABORIST MODEL ON OUTCOMES

	Adjusted odds ratios with 95% confidence intervals
Cesarean delivery	1.02 [0.97,1.1]
Chorioamnionitis	1.07 [0.88,1.30]
Induction of labor	0.85 [0.71,0.99]*
Preterm birth	0.83 [0.72,0.96]*
Maternal prolonged length of stay	0.99 [0.87,1.14]
Apgar 5 min < 7	1.09 [0.69-1.72]
Birth asphyxia	0.75 [0.48-1.18]
Birth injury	0.77 [0.56-1.07]
Birth trauma	1.32 [0.91-1.92]
Birthweight <1500 g	0.93 [0.70-1.22]
Birthweight 1500-2500 g	0.88 [0.78-1.01]

* statistically significant

Source: Srinivas et al. *Am J Obstet Gynecol* 2016

THE IMPLICATIONS

This is the first study to rigorously assess the impact of laborists on maternal and neonatal outcomes. Many hospitals cite increased maternal and neonatal safety and decreased liability of providers as reasons for adopting the laborist model. These findings indicate that the laborist model may reduce the prevalence of induced labor and preterm birth, with no increase in adverse effects.

These results are plausible. The laborist model enables labor and delivery units to operate with continuous labor coverage and with less pressure to schedule deliveries around providers' clinical duties, which could cause the reduction in induced labor. Reducing the rate of labor induction for nonmedical reasons and preterm birth can have vast public health benefits. Labor induction carries a potential increased risk of cesarean delivery, which may have significant future reproductive consequences. However, this study did not detect a significant reduction in the rate of cesarean delivery in the laborist model.

Preterm birth is the leading cause of neonatal mortality and is a considerable contributor to neonatal morbidity. The reduction of spontaneous preterm birth is not entirely explained by the data, since there is little evidence to indicate that physicians can reduce spontaneous preterm birth at the time of delivery. However, laborists may have more knowledge about preterm deliveries, which could account for the decrease in preterm birth amongst the late preterm neonates.

This study demonstrates that the laborist model may decrease the adverse outcomes and cost of obstetric care through a possible reduction in inductions and preterm birth. Additional studies are needed to evaluate the impact of this model in different settings and to further understand the mechanisms by which these outcomes are

possibly improved. Understanding how these outcomes were improved may make these lessons transferrable even in settings without laborists.

THE STUDY

The authors compared pregnancy outcomes of women delivering at traditional hospitals with women delivering at laborist hospitals using a difference-in-differences approach. The hospitals were recruited from the National Perinatal Information Center/Quality Analytic Services and provided data from 1998 to 2011. The characteristics of women delivering at the recruited hospitals represented the general population in age and marital status.

Hospitals were matched by annual volume of deliveries, geography, teaching hospital status, and level of neonatal intensive care. These factors could have correlated with maternal and neonatal outcomes and with the likelihood of transitioning to a laborist model. Each matched set of hospitals contributed at least three years of data prior to implementation of the laborist model and at least two years of data after implementation. Maternal hospitalizations were linked to infant hospitalizations using medical record or billing number.

The outcome measures were chosen based on their public health significance, measures of patient safety, or measures of maternal and neonatal health. Maternal outcome measures included pregnancy complications, such as postpartum hemorrhage, infection, or intensive care admission. Patient safety indicators included perineal lacerations. Preterm birth was defined as delivery before 37 weeks gestation and included spontaneous and medically induced delivery. Neonatal outcomes included birth weight, mortality, birth injury, and neonatal intensive care admission.

To minimize the bias of attributing an existing trend to the implementation of the laborist model, the authors excluded outcome measures that changed significantly between the laborist and nonlaborist hospitals during the three-year implementation period. The final outcomes measured were Cesarean delivery, chorioamnionitis, labor induction, preterm birth, prolonged maternal hospital stay, Apgar score at five minutes, birth asphyxia, injury, trauma, and neonatal death. The authors adjusted their results for possible confounding factors such as socioeconomic status, year of delivery, and maternal comorbid conditions.

ABOUT LDI

Since 1967, the Leonard Davis Institute of Health Economics (LDI) has been the leading university institute dedicated to data-driven, policy-focused research that improves our nation's health and health care. Originally founded to bridge the gap between scholars in business (Wharton) and medicine at the University of Pennsylvania, LDI now connects all of Penn's schools and the Children's Hospital of Philadelphia through its more than 250 Senior Fellows.

LDI Research Briefs are produced by LDI's policy team. For more information please contact Janet Weiner at weinerja@mail.med.upenn.edu.



LEAD AUTHOR

SINDHU SRINIVAS, MD, MSCE

Sindhu Srinivas, MD, MSCE, is an Associate Professor of Obstetrics and Gynecology and the Director of Obstetrical Services at the Hospital of the University of Pennsylvania. Dr. Srinivas' research includes both clinical/epidemiologic and translational research. Current areas of research include: 1) studying and developing obstetric quality measures as well as understanding the impact of practice changes (individual level and system level) on maternal and neonatal outcomes, 2) understanding the etiology of hypertensive disorders of pregnancy, a leading contributor to perinatal and maternal morbidity and mortality worldwide, and 3) understanding health disparities in obstetric outcomes.