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Likelihood of cesarean birth among parous women after applying leading active labor diagnostic guidelines

Jeremy L. Neal[a,*], Nancy K. Lowe[b], Julia C. Phillippi[a], Nicole S. Carlson[c], Amy M. Knupp[d], Mary S. Dietrich[a]

[a] Vanderbilt University School of Nursing, 461 21st Avenue South, Nashville, TN 37240, USA
[b] University of Colorado College of Nursing, 13120 East 19th Avenue, Aurora, CO 80045, USA
[c] Emory University Nell Hodgson Woodruff School of Nursing, 1520 Clifton Rd NE, Atlanta, GA 30322, USA
[d] The Ohio State University Wexner Medical Center, 410 West 10th Avenue, Columbus, OH USA

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ABSTRACT

Objectives: Hospital admission during early labor may increase women's risk for medical and surgical interventions. However, it is unclear which diagnostic guideline is best suited for identifying the active phase of labor among parous women. Dr. Emanuel Friedman, the United Kingdom's National Institute for Health and Care Excellence (NICE), and the American College of Obstetricians and Gynecologists/Society for Maternal-Fetal Medicine (ACOG/SMFM) support different active labor diagnostic guidelines. Our aims were (1) to determine the proportions of parous women admitted to the hospital before or in active labor per these leading guidelines and (2) to compare associations of labor status at admission (i.e., early labor or active labor) with oxytocin augmentation, cesarean birth, and adverse birth outcomes when using the different active labor diagnostic guidelines.
Design: Active labor diagnostic guidelines were applied retrospectively to cervical examination data. Binomial logistic regression was used to assess associations of labor status at admission (i.e., early labor relative to active labor) and outcomes.
Setting: A large, academic, tertiary medical center in the Midwestern United States.
Participants: Parous women with spontaneous labor onset who gave birth to a single, cephalic-presenting fetus at term gestation between 2006 and 2010 ($n = 3,219$).
Findings: At admission, 28.8%, 71.9%, and 24.4% of parous women were in active labor per Friedman, NICE, and ACOG/SMFM diagnostic guidelines, respectively. Oxytocin augmentation was more likely among women admitted in early labor, regardless of the diagnostic strategy used ($p < 0.001$ for each guideline). Cesarean birth was also more likely among women admitted before versus in active labor according to all guidelines (Friedman: adjusted odds ratio [AOR] 3.63 [95% CI 1.46–9.03]), NICE: AOR 2.71 [95% CI 1.47–4.99]), and ACOG/SMFM: AOR 2.11 [95% CI 1.02–4.34]). There were no differences in a composite measure of adverse outcomes within active labor diagnostic guidelines after adjusting for covariates.
Key conclusions: Many parous women with spontaneous labor onset are admitted to the hospital before active labor. These women are more likely to receive oxytocin augmentation during labor and are more likely to have a cesarean birth.
Implications for practice: Diagnosing active labor prior to admission or prior to intervention aimed at speeding labor after admission may decrease likelihoods for primary cesarean births. The NICE dilation-rate based active labor diagnostic guideline is more inclusive than Friedman or ACOG/SMFM guidelines and its use may be the most clinically-useful for improving the likelihood of vaginal birth among parous women.

Introduction

Support of normal physiologic childbirth is a tenet of midwifery (International Confederation of Midwives, 2014). The timing of admission to the hospital for a woman with spontaneous labor onset may affect her opportunity for physiologic birth by

* Corresponding author.
E-mail addresses: jeremy.neal@vanderbilt.edu (J.L. Neal), nancy.lowe@ucdenver.edu (N.K. Lowe), julia.c.phillippi@Vanderbilt.Edu (J.C. Phillippi), nicole.carlson@emory.edu (N.S. Carlson), amy.knupp@osumc.edu (A.M. Knupp), mary.dietrich@vanderbilt.edu (M.S. Dietrich).

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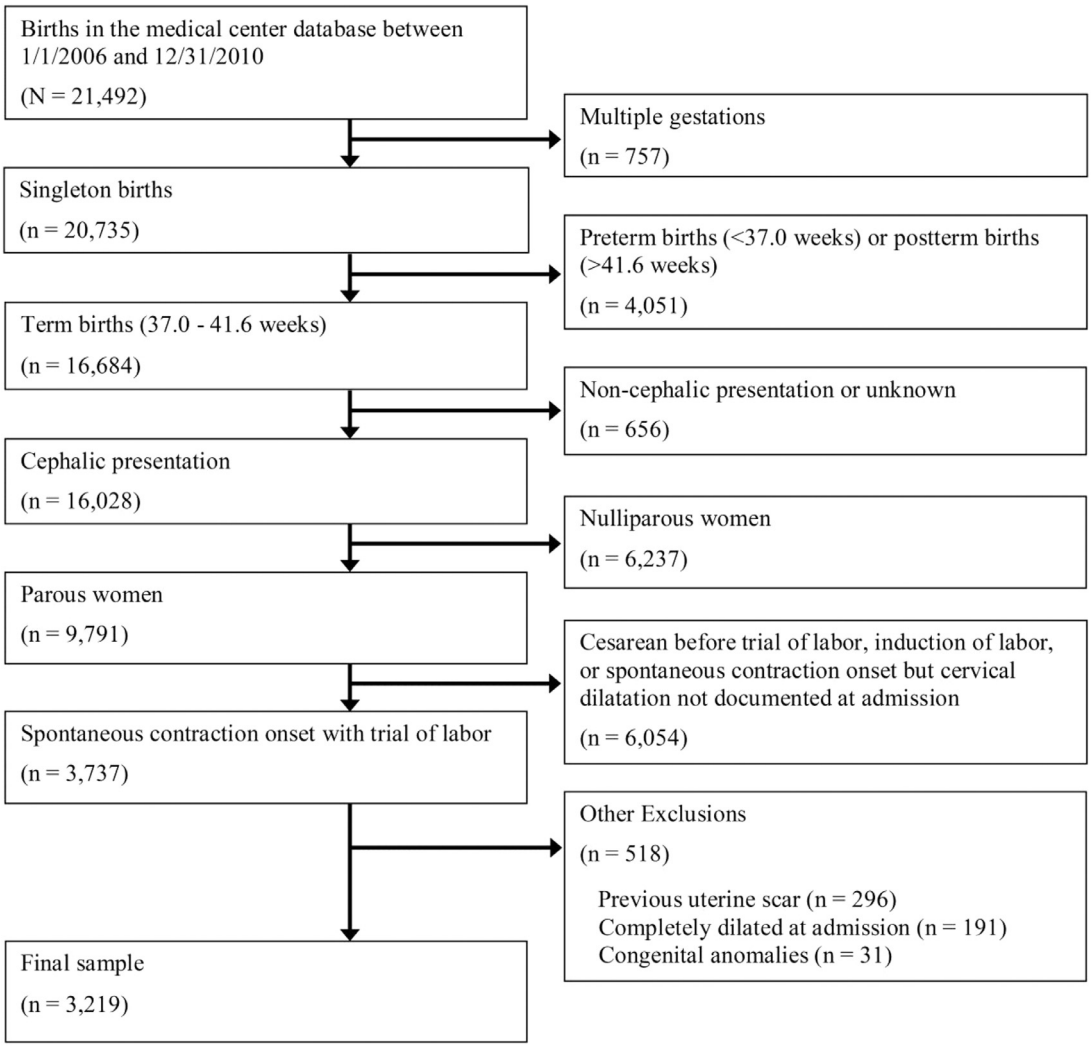

Fig. 1. Diagram of patient selection.

influencing the interventions she receives during childbirth. Admission early in labor increases likelihoods for intrapartum pharmaceutical and surgical intervention (Bailit et al., 2005; Neal et al., 2014, 2017). The American College of Obstetricians and Gynecologists (2017) recently recommended delaying labor admission for women with reassuring status until active labor begins to improve their opportunity for vaginal birth.

The three most prominent active labor diagnostic guidelines for parous women come from Friedman (1956, 1978), the United Kingdom's National Institute for Health and Care Excellence (2014), and the American College of Obstetricians and Gynecologists/Society for Maternal-Fetal Medicine (ACOG/SMFM) (Caughey et al., 2014). Friedman introduced his approach to the graphic analysis of labor progress among parous women in the mid-1950s (Friedman, 1956). Active labor onset was determined individually for each woman based on progressively more rapid dilation until a maximum slope of dilation was reached, most commonly between 2 and 3 cm (Friedman, 1956, 1978; Friedman and Kroll, 1969); the lower limit of normal progress for the majority of active labor was 1.5 cm/h (Friedman, 1978; Friedman, 1956). The NICE guideline stipulates that active labor can be diagnosed when cervical dilation is progressive from 4 cm or more (National Institute for Health and Care Excellence, 2014). A dilation rate of 2 cm in 4 h was presented as the lower limit of normal active labor progress. ACOG and the SMFM have jointly endorsed 6 cm dilatation as the threshold for active labor onset for most women as a strategy for safely decreasing the primary cesarean birth rate in the United States and standards for active labor progress should not be applied before this point (Caughey et al., 2014).

The value and use of these various active labor diagnostic guidelines has been explored in a group of nulliparous women with spontaneous labor onset (Neal et al., 2017). Significantly more women met the NICE active labor guideline at the time of hospital admission than met Friedman or ACOG/SMFM guidelines (Neal et al., 2017). The NICE guideline distinguished likelihoods for cesarean birth better than the other guidelines, with women admitted before versus in active labor being more likely to experience cesarean birth (adjusted odds ratio (AOR) 2.55; 95% CI 1.84–3.53; $p < 0.001$) (Neal et al., 2017). However, which of these guidelines is best suited for clinical use for women with prior births remains unclear.

The aims of our study were (1) to retrospectively determine the proportion of parous women admitted to the hospital before and in active labor when applying Friedman, NICE, and ACOG/SMFM diagnostic guidelines, and (2) to compare associations of labor status at admission (i.e., early labor or active labor) with oxytocin augmentation, cesarean birth, and adverse birth outcomes when using the different active labor diagnostic guidelines.