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RESEARCH

Variation in Hospital Intrapartum Practices and Association With Cesarean Rate

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ABSTRACT

Objective: To examine hospital variation in intrapartum care and its relationship with cesarean rates.

Design: Cross-sectional survey.

Setting: Connecticut and Massachusetts hospitals providing obstetric services.

Participants: Nurse managers or other clinical staff knowledgeable about intrapartum care.

Methods: We assessed labor and birth unit capacity and staffing, fetal monitoring, labor management, intrapartum interventions, newborn care, quality assurance, and performance review practices. Association of hospital characteristics and intrapartum practices with cesarean rate was evaluated using Wilcoxon exact rank sum test and Kendall's tau-b correlation coefficient.

Results: Among 60 eligible hospitals, respondents from 39 hospitals (65%) completed the survey. Cesarean rates varied from 21% to 42% (median = 30%). Regular review of cesarean rates and indications (85%), regular provision of feedback on cesarean rates and indications to physicians (80%), and regular review of vaginal birth after cesarean rates (94%) were commonly performed at responding hospitals. These practices, however, were not associated with hospital cesarean rate. Hospitals that offered cesarean at the request of the woman ($p < .01$) and had more liberal indications for labor induction ($p < .01$) and cesarean birth ($p < .01$) had significantly greater cesarean rates than institutions without these practices. Routinely placing an intravenous line ($p < .01$) and drawing blood for complete blood count/type and antibody screen ($p < .01$) in low-risk women were associated with greater cesarean rates; having a certified nurse-midwife in house at all times ($p = .01$) and permitting women to eat during labor ($p = .02$) were associated with lower cesarean rates.

Conclusion: Intrapartum practices of hospitals varied markedly. These different patterns of care may suggest differing levels of intrapartum intervention.

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Childbirth is the most common reason for hospitalization in the United States (Podulka, Stranges, & Steiner, 2011); it accounted for 3.8 million hospitalizations in 2011 (Torio & Andrews, 2013) and $15.1 billion in hospital costs for childbirth admissions (Moore, Witt, & Elixhauser, 2014). Variation in hospital obstetric care can have a large effect on overall health care quality, safety, and costs. In a recent study, researchers showed large variation in cesarean rates among U.S. hospitals in 2009, with a 15-fold difference in the rates for low-risk women (range = 2.4%–36.5%; Kozhimannil, Law, & Virnig, 2013). In another study, researchers found a more than twofold difference across the 10th to 90th interpercentile range ($2,902–$6,266) in hospital facility costs for maternity stay for low-risk births among U.S. hospitals in 2011 (Xu et al., 2015). Such findings suggest possible overuse of intrapartum interventions at some institutions and highlight the need to understand variation in obstetric practices among hospitals.

The World Health Organization highlighted the need to reduce the number of medically unnecessary cesareans (World Health Organization, 2015). Understanding factors associated with different rates of cesarean among hospitals may inform strategies to safely prevent unnecessary cesareans. However, researchers who examined

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the association of cesarean rate with commonly reported hospital characteristics, such as urban/rural location, teaching status, birth volume, and level of neonatal care unit, showed no significant association with cesarean rate or reported mixed findings (Alnaif & Beydoun, 2012; Coonrod, Drachman, Hobson, & Manriquez, 2008; Kozhimannil et al., 2013; McKenzie & Stephenson, 1993; Newton & Higgins, 1989; Oleske, Glandon, Giacomelli, & Hohmann, 1991; Zdeb, Therriault, & Logrillo, 1980). Such inconsistent evidence suggests that these hospital characteristics are not likely to be key drivers of hospital cesarean rates. Because obstetric care involves multiple providers (nursing staff, obstetricians, midwives, anesthesiologists, and pediatricians) and a mother–infant dyad with often competing interests, a more in-depth assessment of hospital intrapartum practices is needed to better understand factors contributing to variation in cesarean rates.

Therefore, we conducted a survey to examine how the intrapartum practices (i.e., practices related to care during labor and birth) of hospitals in Connecticut and Massachusetts differed, including infrastructure, staffing, labor management policies, use of interventions, quality assurance, and performance review. In addition, we explored the association of these hospital characteristics and practices with cesarean rates to identify and elucidate potential reasons for the large variation in hospital cesarean rates.

Methods

Survey Instrument

To ascertain information about hospital characteristics and intrapartum care practices, we conducted a survey of hospitals that provide obstetric services in Connecticut and Massachusetts. Survey questions and topic areas were selected on the basis of a review of the literature (Alnaif & Beydoun, 2012; Banaszak, 1993; Coonrod et al., 2008; Glantz, 2012; Hueston, 1995; Iriye et al., 2013; Jukkala, Henly, & Lindeke, 2008) and clinical experience of our research team. A preliminary version of the instrument was pilot tested among two hospital nurse managers, two obstetricians, and a neonatologist. Questions were added, removed, or revised according to feedback received.

The final survey instrument included questions about labor and birth unit capacity, staffing arrangement (including composition and availability), institutional infrastructure, fetal monitoring and labor management, induction of labor, operative vaginal birth and cesarean, trial of labor after cesarean (TOLAC), newborn care, staff and resident training, and quality assurance and performance review practices. We asked hospitals about the acceptability of indications for induction of labor and cesarean. Although many labor inductions and cesareans are performed for indications supported by the American College of Obstetricians and Gynecologists (ACOG; 2009; Spong, Berghella, Wenstrom, Mercer, & Saade, 2012), other inductions and cesareans may be performed by hospitals or providers for indications that are not officially supported in practice guidelines (ACOG 2009, 2013; ACOG et al., 2014), which we refer to as *subjective indications* in this article. We surveyed hospitals regarding three subjective indications for induction of labor (including gestational age ≥ 40 weeks, maternal age > 35 years, and presumed macrosomia), and seven subjective indications for cesarean (prematurity, fetal growth restriction, in vitro fertilization pregnancy, cephalic/cephalic twins, severe preeclampsia, maternal age > 40 years, and macrosomia at less than the 5,000-g threshold for women without diabetes). A greater number of subjective indications generally accepted by each hospital served as a marker for more liberal use of induction and cesarean.

Survey Process

Hospitals with obstetric services in Connecticut and Massachusetts were identified using the 2014 *American Hospital Association (AHA) Guide* (AHA, 2014). The *AHA Guide* contained facility codes reflecting service categories, such as obstetrics, provided by each hospital as of May 31, 2013, and hospital phone numbers. We approached each institution by telephone to confirm provision of obstetric services and request contact information for an appropriate survey respondent (nurse manager of the labor and birth unit or other personnel familiar with maternity care at the hospital). For hospital systems including more than one institution with obstetric services, each site was contacted for separate survey responses. The survey was conducted from April through July 2014 using a multimodal approach: when an e-mail address was provided, an electronic link to the Web-based survey was sent; alternately, the survey was sent by mail with a postage-paid return envelope if a hard copy was requested or only a mailing address was available. Two reminders were sent to nonrespondents via e-mail or mail

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