Continuing Education Module

# Fetal Monitoring: Creating a Culture of Safety With Informed Choice

Lisa Heelan, MSN, FNP-BC

**ABSTRACT**

The dominant culture in labor and birth is the medical model, not the midwifery model of woman-centered care. Consensus among professional and governmental groups is that, based on the evidence, intermittent auscultation is safer to use in healthy women with uncomplicated pregnancies than electronic fetal monitoring (EFM). Barriers impact the laboring woman's ability to give informed choice regarding fetal monitoring. Lack of informed choice denies a woman her right to be in control of her birth experience, and is in opposition to a woman's right to autonomy and self-determination.

*The Journal of Perinatal Education*, *22*(3), 156–165, http://dx.doi.org/10.1891/1058-1243.22.3.156
*Keywords*: fetal monitoring, informed choice, autonomy, culture of safety, maternity care, childbirth education, nursing

*For AWHONN guidelines for Fetal Monitoring see: http://wwww.awhonn.org/awhonn/binary.content.do?name=Resources/Documents/pdf/5_FHM.pdf*

Over the last five decades, women have been acculturated to continuous electronic fetal monitoring (EFM) during childbirth, and accept this type of labor management as part of the normal birth process (Hindley, Hinsliff, & Thomson, 2008; Sandin-Bojo, Larsson, & Hall-Lord, 2008); however, not all women need EFM. Women with preeclampsia, type 1 diabetes, preterm birth, and suspected intrauterine fetal growth restriction have high risk conditions and should be monitored with EFM; healthy women without complications would be considered low risk and can use intermittent auscultation (American College of Obstetricians and Gynecologists [ACOG], 2009).

Intermittent auscultation is a safe and acceptable fetal monitoring method that is recommended during labor with low-risk pregnancies.

Continuous EFM is associated with many known medical risks to women, without providing any benefit to the fetus in low-risk pregnancies (Alfirevic, Devane, & Gyte, 2006; ACOG, 2009). An alternative option for healthy women with uncomplicated pregnancies is intermittent auscultation (IA). IA is a safe and acceptable fetal monitoring method that is recommended during labor with low-risk pregnancies (ACOG, 2009; Anderson, 1994; Association of Women's Health and Obstetric and Neonatal Nurses [AWHONN], 2008; National Institute of Clinical Excellence [NICE], 2007; The Royal Australian and New Zealand College of

Obstetricians and Gynaecologists [RANZCOG], 2009; United States Preventative Services Task Force [USPSTF], 1996; World Health Organization [WHO], 1996).

There is limited research exploring a woman's ability to give informed choice regarding which method of fetal monitoring to use (Hindley et al., 2008; O'Cathain, Thomas, Walters, Nicholl, & Kirkham, 2002). Many barriers exist preventing nurses from implementing IA during the intrapartum period (Graham, Logan, Davies, & Nimrod, 2004; Lewis & Rowe, 2004; Rattray, Flowers, Miles, & Clarke, 2011; Regan & Liaschenko, 2007; Sleutel, Schultz, & Wyble, 2007). The purpose of this article is to review the history of fetal monitoring; address factors influencing the fetal heart rate during labor; report on the different types of fetal monitoring available; discuss barriers identified in the literature inhibiting the implementation of fetal monitoring choice in childbirth; and provide suggestions to incorporate evidence-based material into childbirth classes.

## OVERVIEW OF FETAL MONITORING

Although the fetal heart sound was first described in a poem in the 1600s, it was not until the mid-1800s that abnormal fetal heart rates were associated with fetal distress signifying the need for a forceps intervention (Freeman & Garite, 1981). At the time, evaluating a fetus was primarily accomplished by putting one's ear to the maternal abdomen, or using a Laennec instrument (cylindrical in shape and similar to the Pinard) to auscultate the fetal heart rate (Freeman & Garite, 1981). The first fetal electrocardiogram (EKG) recording was in 1906 (Freeman & Garite, 1981); 50 years later, Dr. Hon from Yale University was able to identify causes of bradycardia leading to fetal distress by monitoring the fetal heart rate continuously from the maternal abdomen (Hon & Lee, 1963).

Continuous EFM was embraced by the obstetric community, including nursing (Sandelowski, 2000), even though clinical trials did not show evidence supporting its use in low-risk women when compared to IA (Banta & Thacker, 1979; Dixon, 1981; Haverkamp, Thompson, McFee, & Cetrulo, 1976). Over time, the cardiography machine (EFM) became smaller and less bulky, which allowed this technology to fit at the bedside more easily and be used. By 1978, EFM was in routine use in one-half of all labors (Williams & Hawes, 1979); in 2002, 85% of all women were assessed with EFM (Martin et al., 2003). Although the evidence does not support this type of technology being used in low-risk pregnancies, EFM has become a standard of care in childbirth practice for women in the United States.

Approximately 2 out of 1,000 children have cerebral palsy with the main risk factors for cerebral palsy being low birth weight, intrauterine infections, and multiple gestations.

## FACTORS INFLUENCING FETAL HEART RATE CHANGES

Fetal monitoring is used to assess the adequacy of fetal oxygenation during labor (ACOG, 2009) with the goal being to prevent metabolic acidemia. Metabolic acidemia can develop over 60 min following a fetus being deprived of adequate oxygenation (Parer, King, Flanders, Fox, & Kilpatrick, 2006). Hypoxia during labor can be caused by compression of the umbilical cord, or in more serious cases, by decreased placental perfusion during a uterine contraction seen in late decelerations (Miller & Miller, 2012).

Metabolic acidemia is associated with increased rates of neonatal morbidity, specifically cerebral palsy (Miller & Miller, 2012; Parer et al., 2006); however, fetal hypoxia during labor is a very rare cause of cerebral palsy (Blair & Stanley, 1988). Approximately 2 out of 1,000 children have cerebral palsy with the main risk factors for cerebral palsy being low birth weight, intrauterine infections, and multiple gestations (Odding, Roebroeck, & Stam, 2006).

Factors not directly related to hypoxia that can contribute to negative changes in fetal heart rate patterns include the presence of maternal fever and infection, medications, and hyperthyroidism (Miller & Miller, 2012). Maternal infection has been linked to low Apgar scores, neonatal seizures (Grether & Nelson, 1997), and cerebral palsy (Grether & Nelson, 1997; Wu & Colford, 2000). Other causes of fetal heart rate changes include conditions involving the fetus: sleep cycle; infection; anemia; arrhythmia; preexisting neurologic injury; heart block; and congenital anomalies (Miller & Miller, 2012).

## DIFFERENT TYPES OF FETAL MONITORING

Fetuses are generally monitored during labor externally from the mother's abdomen using either a cardiotocograph machine (EFM), Pinard fetal

stethoscope, or an ultrasound handheld fetal doppler (Alfirevic et al., 2006).

### *Continuous Electronic Fetal Monitoring*

External continuous cardiotocographic monitoring (EFM) is the most common method of assessing fetuses in the United States while in labor (Martin et al., 2003), and it requires a woman to be immobile to obtain accurate readings. Two straps are placed around her abdomen, with one strap containing the Doppler ultrasound transducer to monitor the fetus's heart rate and the other having a pressure transducer to monitor uterine contractions (Alfirevic et al., 2006). EFM is associated with high false positive rates and inconsistent fetal heart rate tracing interpretations, both of which contribute to an inability to accurately predict fetal hypoxia (Alfirevic et al., 2006; Tekin et al., 2008).

Continuously monitoring the fetus during labor is associated with a significant increase in cesarean surgery, instrumental vaginal births, and maternal infection with no reduction of cerebral palsy or neonatal death when it is compared to IA (Alfirevic et al., 2006). Although neonatal seizures are rare events (1 in 500 births), the incidence is decreased with the use of EFM, but only in high-risk pregnancies, not in uncomplicated pregnancies (Chen, Chauhan, Ananth, Vintzileos, & Abuhamad, 2011); for every 661 women who receive EFM during labor, one neonatal seizure will be prevented (Alfirevic et al., 2006).

### *Central Fetal Monitoring*

Many hospitals have switched to central fetal monitoring, a type of monitoring system that allows nurses to remain at the nurses' station to observe many fetal monitoring tracings at one time. This centralization of care runs the risk of nurses not entering a laboring woman's room as frequently. Central fetal monitoring is expensive to set up and maintain, and has not been shown to be of benefit in comparison to EFM at the bedside (Withiam-Leitch, Shelton, & Fleming, 2006). In a study comparing central fetal monitoring with no central monitoring, there was a statistically significant increase in cesareans ($p = .01$) and operative vaginal births ($p = .05$) for nonreassuring fetal heart rate tracings associated with central monitoring (Weiss, Balducci, Reed, Klasko, & Rust, 1997).

The guidelines for healthy women with uncomplicated pregnancies do not recommend continuous monitoring.

### *Intermittent Auscultation*

The Pinard fetal stethoscope and the handheld Doppler are used to assess the fetus intermittently, which allows the woman to move about more freely and have more control. The Pinard fetal stethoscope was developed in the 1880s, and was in wide use in the 1950s (Hale, 2008); the handheld Doppler was developed in the 1960s (Hale, 2008). Both of these methods are relatively simple to use, and are commonly used during prenatal visits. The advantage of the handheld Doppler is that the woman and others in the room can also hear the fetal heart beat, whereas with the Pinard, only the clinician can hear the fetal heart sounds. Intermittent auscultation also provides the human element of touch and being cared for by a person, and not a machine.

### *Frequency of Monitoring*

Most of the guidelines recommended by professional organizations are based on expert consensus opinion (Sholapurkar, 2010), and research that did not differentiate between low-risk and high-risk pregnancies in the same studies (AWHONN, 2008). This has led to policies that are inconsistent and not based on evidence.

When using IA, two professional organizations recommend an assessment every 15 min during the active phase of the first stage of labor, and every 5 min during the second stage of labor (ACOG, 2009; NICE, 2007). Three different professional organizations suggest an assessment every 15–30 min during the active phase of the first stage of labor (AWHONN, 2008; RANZCOG, 2009; Society of Obstetricians and Gynaecologists of Canada [SOGC], 2007), and every 5–15 min during the second stage (AWHONN, 2008). These protocols have major implications for an expected 1:1 ratio of nursing care during the active phase of the first stage of labor when IA is used.

Among professional organizations there is less disagreement regarding frequency of monitoring when EFM is used in healthy women with uncomplicated pregnancies. When this method is employed, fetuses need to be assessed every 30 min during the active phase of the first stage of labor, and every 15 min during the second stage (ACOG, 2009; AWHONN, 2008). The guidelines

for healthy women with uncomplicated pregnancies do not recommend continuous monitoring (ACOG, 2009; AWHONN, 2008). Labor support reflecting a 1:1 nurse-to-patient ratio is recommended by AWHONN (2008) for all women during the second stage of labor, regardless of the type of fetal monitoring used.

### *Additional Testing With EFM*

Internal monitoring is added to EFM if fetal distress is suspected and includes fetal scalp blood sampling, fetal pulse oximetry, or ST segment analysis (STAN; Ayres-de-Campos, et al., 2010; East, Brennecke, King, Chan, & Colditz, 2006; Kale, Chong, & Biswas, 2008; Tekin et al., 2008).

Fetal blood sampling (FBS) is not a new procedure and was used in women with preeclampsia and in postterm fetuses in the 1960s to directly assess the fetus for metabolic acidosis (Saling, 1966). The problems encountered during that time are the same now, specifically, this procedure is invasive, uncomfortable for the laboring woman, requires membranes to be ruptured, and requires an adequately dilated cervix (Tekin et al., 2008).

Fetal pulse oximetry, like FBS, is used to improve the specificity of EFM (Kale et al., 2008), and when compared to EFM only, versus EFM and FBS, did have a statistically significant decrease in cesarean surgeries for nonreassuring fetal heart rate (RR 0.65, 95% CI); however, it was not beneficial in reducing cesareans when used in labors with dystocia (East, Begg, & Colditz, 2007). There were no differences in neonatal outcomes (East et al., 2006).

STAN is another adjunct to EFM when hypoxia is suspected, and it increases the identification of fetuses with metabolic acidosis (Ayres-de-Campos et al., 2010). Because of different interpretations of EFM tracings, adverse neonatal outcomes continue to occur with STAN, with no difference in the perinatal mortality rate (Ayres-de-Campos et al., 2010) or significant differences in primary outcomes (Neilson, 2012). This procedure, like FBS, is invasive, and requires passing an electrode through the woman's cervix and applying the electrode to the fetal scalp (Neilson, 2012) with at least 20 min needed to calibrate the FHR baseline (Ayres-de-Campos et al., 2010).

Nursing and medicine should perform a test or provide a treatment to improve an outcome. Continuous EFM is not effective in improving outcomes in healthy women with uncomplicated pregnancies, yet to try to make it more effective, additional procedures are being added to EFM, with no change in neonatal outcomes; limited benefit in decreasing the risk of a cesarean surgery when a nonreassuring FHR is noted; and increased pain and discomfort to the laboring woman.

## EFFICACY OF EFM

In 2004, 28,014 neonates died, reflecting 0.68% of all U.S. births that year (U.S. Department of Health and Human Services [USDHHS], 2004). Chen et al. (2011) compared EFM to no EFM in labor using data from U.S. birth certificates from 2004. The primary finding was that EFM during labor significantly lowered early neonatal (within the first 6 days of birth) and infant mortality (deaths within the first year) (RR 0.50, $p < .001$), with the greatest benefit observed in preterm births: 24–27 weeks' gestation (128.1 vs. 207.7, $p < .001$); 28–31 weeks' gestation (14.9 vs. 28.6, $p < .001$); 32–33 weeks' gestation (2.4 vs. 6.3, $p = .001$); and 34–36 weeks' gestation (0.5 vs. 1.3, $p < .001$). There was no benefit of EFM on newborn mortality in the late neonatal period (7–27 days after birth) (0.5 vs. 0.6, $p = .402$) and postneonatal period (28–364 days after birth) (1.7 vs. 1.8, $p = .296$). Although continuous EFM did have a beneficial effect on preventing neonatal mortality in preterm births, the benefit decreased as the fetus got closer to a term birth.

In the same study, Chen et al. (2011) reported a very small benefit to newborns born ≥37 weeks if EFM was used (0.2 vs. 0.3, $p < .001$); however, this category reflected a wide range of gestational ages from 37 to 44 weeks. Data from the National Vital Statistics System obtained for this study are categorized as follows: 37–39 weeks, 40 weeks, 41 weeks, and 42 weeks or more (USDHHS, 2004). By grouping all newborns born after 37 weeks into one category, 7.1% of the newborns included in this one category were postterm (USDHHS, 2004). This finding is consistent with previous reports which reflect 7% of all U.S. births as postterm (Martin et al., 2003). Postterm birth is associated with increased perinatal mortality (stillbirths and early neonatal deaths), which is twice that of term births, and increases sixfold and higher at 43 weeks of gestation or beyond (ACOG, 2004).

Because this study did not have separate categories for term (38–42 weeks) and postterm births (42–44 weeks), and there was lack of clarity

of whether the data represented completed weeks of gestation, Chen et al.'s study (2011) cannot suggest that EFM has reduced the incidence of early neonatal mortality and morbidity in healthy women with uncomplicated pregnancies at term.

## BARRIERS TO INFORMED CHOICE

Knowing what is known, consumers have to wonder why EFM is a standard of care for healthy women with uncomplicated pregnancies. In addition to the initial cost of purchasing an EFM machine, there are the hidden costs of EFM when it is overused. It costs money to keep nurses and doctors certified to read EFM strips, maintain EFM machines, buy the supplies that go with EFM machines, store EFM strips, and pay for the increased costs of electricity to continuously operate the EFM machines; and if documentation is not done well, or is inaccurate, it sets the hospital and staff up for possible malpractice (Romano & Lothian, 2008). Spending money is warranted if it improves outcomes, but in healthy women with low-risk pregnancies, money is being spent on EFM, and outcomes are worsening.

### *Malpractice*

Fear of litigation is often mentioned as a reason for EFM (Chalmers et al., 2009; Lewis & Rowe, 2004); however, in reality, obstetric malpractice claims have risen as cesarean surgeries have gone up (Clark, Belfort, Byrum, Meyers, & Perlin, 2008). When detailed and highly specific protocols with effective peer review were initiated at the Hospital Corporation of America, cesarean surgeries fell and malpractice claims plummeted (Clark et al., 2008). Murray and Huelsmann (2007) reported that common areas for litigation involve claims related to oxytocin (Pitocin) misuse that led to perinatal death and injury. Kesselheim et al. (2010) evaluated malpractice claims of infants with neurological impairment who had a nonreassuring FHR pattern during labor. Pregnancies where the laboring woman reported prenatal vaginal bleeding ($p = .004$, $OR = 27.1$), a long labor during the first stage ($p = .030$, $OR = 4.0$), or minimal variability on EFM in the first stage ($p = .020$, $OR = 4.3$) were more likely to have an infant with neurological complications when compared to fetuses with nonreassuring patterns who were born healthy.

When those caring for pregnant women express concern about malpractice, one has to evaluate what the evidence shows, and then use this information as an opportunity to change the way care is provided. Women who present in labor with a history of prenatal bleeding, or have a very long labor during the first stage, or minimal variability on EFM during the first stage of labor, need special attention—not to avoid malpractice but to have a healthy baby and mother.

### *Institutional Barriers*

Nurses want to provide optimal care during labor but feel that birth today is hastened and controlled, which leads to medical interventions that are not necessary (Sleutel et al., 2007). Nurses, physicians, administrators, and patients are viewed by nurses as all contributing toward a culture where the focus is on the technology, and the patient is forgotten (Sleutel et al., 2007).

A facility culture that supports implementing evidence-based change is more likely to institute IA policies for healthy women with uncomplicated pregnancies than one that doesn't (Graham et al., 2004; Sleutel et al., 2007). Although change can occur from administration, change is more likely to be implemented if nursing staff have input into creating and supporting the change prior to the initiation of the new policy (Graham et al., 2004). Nursing leadership also needs to get the support of obstetricians and the anesthesiology department if the guidelines are to be endorsed as a unit policy (Graham et al., 2004). In one of the hospitals identified in Graham et al.'s (2004) study, change occurred as a direct response to consumer pressure for IA.

Although the policy changed at the three hospitals identified in Graham et al.'s (2004) study, additional barriers were identified by nurses that prevented the IA policy from being fully embraced. The barriers included lack of dopplers; concerns about the legal ramification if no paper strip was present; anesthesiology wanting EFM on women receiving epidurals (although this practice was eventually changed at one of the hospitals); auscultation skills and labor support had to be learned or relearned; a 1:1 nurse-to-patient staffing ratio was not always maintained; nurses liked central monitoring to chart and monitor the FHR from outside the labor room; nurses trusted EFM, and felt it provided security; and women who had previously received EFM viewed the technology as providing them with quality care (Graham et al., 2004).

### *Nurses*

Midwives make a decision to use EFM at two critical times: the initial assessment (which is ineffective in improving neonatal outcomes in healthy women with uncomplicated pregnancies [Devane, Lalor, Daly, McGuire, & Smith, 2012]) and when the midwife categorizes the woman as high-risk or low-risk based on the midwife's personal clinical risk schema and not evidenced-based clinical guidelines (Rattray et al., 2011).

The way a nurse views childbirth influences cesarean surgery rates (Regan & Liaschenko, 2007), and could influence the adherence to IA protocols. In Regan and Liaschenko's study (2007), three cognitive frameworks of childbirth were identified: birth as a natural process; birth as a lurking risk; and birth as a risky process. Nurses who viewed birth as a natural physiologic process supported the laboring woman as a "credible knower" who was competent to perform birth. The role of the nurse was as an expert guide. Nurses with this cognitive frame of reference viewed the laboring woman and fetus as an inseparable whole. Nurses who viewed birth as a lurking risk believed that the nurses were the expert knowers, not the laboring woman. And the nurses who viewed birth as risky viewed the fetus as the focus of care, and the birth process as inevitably filled with risk. The nurses who viewed birth as risky were more likely to use EFM continuously, and to offer epidurals. The authors hypothesized that for the nurses who viewed birth as risky, cesarean surgeries would be higher.

Translating theory into practice is a challenge, with many midwives being supportive of IA, yet feeling powerless to go against a system favoring an interventionist approach in childbirth (Hindley & Thomson, 2005). Barriers to informed choice include a midwife's belief that technology enhanced her professional status and was of higher value than her intuitive knowledge and skills; the labor unit being too busy to have conversations about EFM; and fear of litigation (Hindley & Thomson, 2005; Lewis & Rowe, 2004).

### *Childbirth Education*

Childbirth education, like birth in the United States, is now predominantly conducted in hospital settings and not in the home (DeVries & DeVries, 2007). This shift from the home to the hospital has contributed to childbirth educators being employed by hospitals, thereby setting up a potential conflict of interest and ethical distress (Ondeck, 2009). Although the Code of Ethics for Childbirth Educators expects childbirth educators to promote normal physiologic birth (Lamaze International, 2006), many pregnant women are instead being acculturated to hospital routines and policies, including EFM, during childbirth education classes.

Nurses who viewed birth as a natural physiologic process supported the laboring woman as a "credible knower" who was competent to perform birth.

One of the goals of Healthy People 2020 is to increase the proportion of women attending childbirth classes (USDHHS, 2011). In the Listening to Mothers Survey II, the percentage of first-time mothers attending childbirth classes was about 56%, and 9% for experienced mothers (Lothian, 2007a). These figures are nowhere near the greater than 90% goal a previous Healthy People strove for.

To assess if mothers who had attended childbirth classes had increased knowledge to make informed decisions, Lothian (2007a) analyzed the data from the Listening to Mothers II survey and compared the different groups of mothers. Almost all of the mothers, including the mothers who had never attended a childbirth class, wanted to know the risks associated with cesarean surgeries, epidurals, and inductions that have become routine in childbirth. In addition, most women, even the women who had attended childbirth classes, did not know the complications associated with induction of labor or cesarean surgeries. This data strongly suggests that the way childbearing women are currently being educated is not working and that women may not have the necessary information to give informed consent.

## INFORMED CHOICE

Informed choice was perceived as being highest for a blood test to screen for Down syndrome (75%, $p <$ .001) and lowest for EFM (31%, $p < .001$; O'Cathain et al., 2002). Although midwifery practice places value in advocating for women and babies and providing informed choice, the reality is that women in labor choose what the midwife thinks is best, which isn't always based on evidence (Hindley & Thomson, 2005).

Using the theoretical framework of Barrett's Theory of Power (Barrett, 1990), a laboring woman cannot give informed consent for fetal monitoring without first making an informed choice. An

Creating a culture of safety starts during the prenatal period and requires childbirth educators and maternity nurses to recognize the power within each woman to make an informed choice based on evidence.

informed choice occurs after the woman has been made aware of her evidenced-based options. The role of the nurse is to enhance the power of the laboring woman by thoroughly responding to questions related to fetal monitoring while at the same time demystifying the benefits of EFM in pregnancies that are low risk. The nurse supports the woman's decision regarding the type of fetal monitoring chosen without having a vested interest in what the woman freely chooses.

Discussions about fetal monitoring ideally need to take place prior to the onset of labor, with the understanding that if the woman's condition changes, ongoing discussions need to take place; knowledge through education is thought to empower women. However, in Machin and Scamell's (1997) study, women who entered the labor unit wanting a nonmedicalized birth ended up feeling disempowered and dissatisfied with their birth experience, which was a different outcome from the women who were willing to go along with the medical system culture. In the end, regardless of what the women wanted for their personal labor and birth experience, the final outcome for all of the women in this study was the same: Personal autonomy was relinquished to the dominant medical culture, with the full participation of nursing (Machin & Scamell, 1997).

## PUTTING THEORY INTO PRACTICE

Childbirth educators want pregnant women to make an informed choice based on evidence, and at the same time, want to support a woman regardless of her decision. Unlike 30 years ago, women now have access to books, videos, and online media to tell them about the birth process. As a result, many pregnant women arrive to childbirth classes already having made decisions about what they want for their birth experience.

The way information is conveyed during childbirth classes needs to be evaluated because information overload has been reported. Lothian (2007b) suggests that childbirth education classes need to have less content focused on hospital policies and the different stages and phases of labor. In its place, Lothian recommends more emphasis be placed on practical ways of having an easier and less complicated birth. Lothian suggests storytelling as a way of sharing information. Examples of laboring women having more mobility and control when IA is used can be shared during group discussions. James (2010) and Abe (2010) advocate childbirth classes being a forum to practice making informed choices through role playing. Pregnant women and their partners can learn during a class how to advocate for IA instead of EFM, so that the words and the scenarios have been rehearsed prior to being in labor.

To provide content that is evidenced-based and not viewed as biased, Tumblin (2007) has integrated the word "choice" throughout every childbirth class. Tumblin also reported that prior to her class on interventions, she has each class member choose an intervention and research the topic. Using this teaching strategy, the class member who selects EFM would then lead the group in discussion by being knowledgeable in the risks and benefits of EFM and IA. This teaching strategy changes the dynamics of childbirth education by shifting the locus of control onto the pregnant woman. Opportunities to teach also provide a venue for the group to share thoughts and feelings regarding EFM and IA, and to own the knowledge (Nolan, 2009).

Regardless of which teaching strategy is used, the most important ingredient for success is to keep the pregnant woman and her partner as the focus. Nolan (2009) believes a childbirth education class should be based on what women most want to learn, not a routine curriculum format. This strategy is also supported by James (2010) who recommends contacting group members before the first class, and midway through the course, to see what they are interested in learning more about. Using some of these strategies provides an opportunity for pregnant women and their partners to learn how to communicate their needs (Nolan, 2009).

## IMPLICATIONS FOR PRACTICE

The overarching goal of childbirth education is to have a healthy birth. Childbirth practices should not constitute a one-size-fits-all approach. Nurses and childbirth educators need to focus their attention on the patient, and not a machine. The indiscriminate

use of EFM in the labor room is not improving outcomes, and is actually causing harm to healthy women with uncomplicated pregnancies. Employing a low-tech, high-touch approach needs to be the main philosophy while providing nursing care to most laboring women.

Creating a culture of safety starts during the prenatal period and requires childbirth educators and maternity nurses to recognize the power within each woman to make an informed choice based on evidence. Childbirth classes envisioned in a new light provide an educational forum for pregnant women and their partners to learn how to communicate their needs, share their wisdom, and develop skills of advocacy so that a healthy birth can be achieved.

## REFERENCES


Abe, D. (2010). Teaching the facts: The dilemma of evidence-based care. *International Journal of Childbirth Education*, *23*(4), 9–14.

Alfirevic, Z., Devane, D., & Gyte, G. M. (2006). Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labor. *The Cochrane Database of Systematic Reviews*, *19*(3), CD006066. http://dx.doi.org/10.1002/1465185.CD006066

American College of Obstetricians and Gynecologists. (2004). ACOG Practice Bulletin No. 55. Management of postterm pregnancy. *Obstetrics & Gynecology*, *104*(3), 639–646.

American College of Obstetricians and Gynecologists. (2009). ACOG Practice Bulletin No. 106. Intrapartum fetal heart monitoring: Nomenclature, interpretation, and general management principles. *Obstetrics & Gynecology*, *114*(1), 192–202.

Anderson, G. (1994). Intrapartum electronic fetal monitoring. *Canadian Task Force on the Predictors of Fetal Distress*. Retrieved from http://www.phac-aspc.gc.ca/publicat/clinicclinique/pdf/s1c15e.pdf

Association of Women's Health and Obstetric and Neonatal Nurses. (2008). *Fetal heart monitoring*. Washington, DC: Author.

Ayres-de-Campos, D., Ugwumadu, A., Banfield, P., Lynch, P., Amin, P., Horwell, D., . . . Rosen, K. (2010). A randomized clinical trial of intrapartum fetal monitoring with computer analysis and alerts versus previously available monitoring. *BMC Pregnancy and Childbirth*, *10*(71).

Banta, H. D., & Thacker, S. (1979). Policies toward medical technology: The case of electronic fetal monitoring. *American Journal of Public Health*, *69*(9), 931–935.

Barrett, E. A. (1990). *Measurement of nursing outcomes: Measuring client self care and coping skills* (Vol. 4). New York, NY: Springer Publishing.

Blair, E., & Stanley, F. J. (1988). Intrapartum asphyxia: A rare cause of cerebral palsy. *Journal of Pediatrics*, *112*(4), 515–519.

Chalmers, B., Kaczorowski, J., Levitt, C., Dzakpasu, S., O'Brien, B., Lee, L., . . . Young, D. (2009). Use of routine interventions in vaginal labor and birth: Findings from the maternity experiences survey. *Birth*, *36*(1), 13–25.

Chen, H. Y., Chauhan, S. P., Ananth, C. V., Vintzileos, A. M., & Abuhamad, A. Z. (2011). Electronic fetal heart rate monitoring and its relationship to neonatal and infant mortality in the United States. *American Journal of Obstetrics & Gynecology*, *204*, 491.e1–491.e10. http://dx.doi.org/10.1016/j.ajog.2011.04.024

Clark, S., Belfort, M., Byrum, S., Meyers, J., & Perlin, J. (2008). Improved outcomes, fewer cesarean deliveries, and reduced litigation: Results of a new paradigm in patient safety. *American Journal of Obstetricians and Gynecology*, *199*(2), 105.e1–105.e7. http://dx.doi.org/10.1016/j.ajog.2008.01.031

Devane, D., Lalor, J. G., Daly, S., McGuire, W., & Smith, V. (2012). Cardiotocography versus intermittent auscultation of fetal heart on admission to labour ward for assessment of fetal wellbeing. *The Cochrane Database of Systematic Reviews*, *5*(2), 100. http://dx.doi.org/10.1022/14651858.CD005122.pub4

DeVries, C. A., & DeVries, R. G. (2007). Childbirth education in the 21st century: An immodest proposal. *The Journal of Perinatal Education*, *16*(4), 38–48. http://dx.doi.org/10.1624/105812407X244958

Dixon, A. (1981). The electronic fetal monitor: Should every mother have one? *Canadian Family Physician*, *27*, 1023–1028.

East, C. E., Begg, L., & Colditz, P. B. (2007). Fetal pulse oximetry for fetal assessment in labour. *The Cochrane Database of Systemic Reviews*, *18*(2), CD004075. http://dx.doi.org/10.1002/14651858.CD004075.pub3

East, C. E., Brennecke, S. P., King, J. F., Chan, F. Y., & Colditz, P. B. (2006). The effect of intrapartum fetal pulse oximetry, in the presence of a nonreassuring fetal heart rate pattern, on operative delivery rates: A multicenter, randomized, controlled trial. *American Journal of Obstetrics & Gynecology*, *194*, 606–616. http://dx.doi.org/10.1016/j.ajog.2005.08.051

Freeman, R. K., & Garite, T. J. (1981). *Fetal heart rate monitoring*. Baltimore, MD: Williams & Wilkins.

Graham, I. D., Logan, J., Davies, B., & Nimrod, C. (2004). Changing the use of electronic fetal monitoring and labor support: A case study of barriers and facilitators. *Birth*, *31*(4), 293–301.

Grether, J. K., & Nelson, K. B. (1997). Maternal infection and cerebral palsy in infants of normal birth weight. *Journal of the American Medical Association*, *278*(3), 207–211. http://dx.doi.org/10.1001/jama.1997.03550030047032

Hale, R. (2008). Monitoring fetal and maternal wellbeing. *British Journal of Midwifery, 16*(10), 682–685.

Haverkamp, A., Thompson, H., McFee, J., & Certulo, C. (1976). The evaluation of continuous fetal heart rate

monitoring in high risk pregnancy. *American Journal of Obstetrics & Gynecology*, *125*(3), 310–320.

Hindley, C., Hinsliff, S. W., & Thomson, A. M. (2008). Pregnant women's views about choice of intrapartum monitoring of the fetal heart rate: A questionnaire survey. *International Journal of Nursing Studies*, *45*, 224–231. http://dx.doi.org/10.1016/j.ijnurstu.2006.08.019

Hindley, C., & Thomson, A. M. (2005). The rhetoric of informed choice: Perspectives from midwives on intrapartum fetal heart rate monitoring. *Health Expectations*, *8*, 306–314.

Hon, E., & Lee, S. (1964). The fetal electrocardiogram: Measuring technics. *Obstetrics and Gynecology*, *24*(1), 6–11.

James, K. (2010). Teaching what is possible vs. what is probable. *International Journal of Childbirth*, *25*(3), 11–12.

Kale, A., Chong, Y. S., & Biswas, A. (2008). Effect of availability of fetal ECG monitoring on operative deliveries. *Acta Obstericia et Gynecologica*, *87*, 1189–1193. http://dx.doi.org/10.1080/00016340802460289

Kesselheim, A. S., November, M. T., Lifford, K. L., McElrath, T. F., Puopolo, A. L., Orav, J., & Studdert, D. M. (2010). Using malpractice claims to identify risk factors for neurological impairment among infants following non-reassuring fetal heart rate patterns during labour. *Journal of Evaluation in Clinical Practice*, *16*, 476–483. http://dx.doi.org/10.1111/j.13652753.2009.01148.x

Lamaze International. (2006, June). *Code of ethics for Lamaze Certified Childbirth Educators*. Retrieved from http://archive.lamaze.org/WhoWeAre/Policies/CertificationCouncilLCCECodeofEthics/tabid/561/Default.aspx

Lewis, L., & Rowe, J. (2004). Focus on the beat: Current fetal monitoring practice in low risk labour. *Australian Midwifery Journal of the Australian College of Midwives*, *17*(4), 6–10.

Lothian, J. A. (2007a). Listening to Mothers II: Knowledge, decision-making, and attendance at childbirth education classes. *The Journal of Perinatal Education*, *16*(4), 62–67. http://dx.doi.org/10.1624/105812407X244723

Lothian, J. A. (2007b). Selling normal birth: Six ways to make birth easier. *The Journal of Perinatal Education*, *16*(3), 44–46.

Machin, D., & Scamell, M. (1997). The experience of labour: Using ethnography to explore the irresistible nature of the bio-medical metaphor during labour. *Midwifery*, *13*, 78–84.

Martin, J. A., Hamilton, B. E., Sutton, P. D., Ventura, S. J., Menacker, F., & Munson, M. L. (2003). Births: Final data for 2002. *National Vital Statistics Reports*, *52*(10), 1–113.

Miller, D. A., & Miller, L. A. (2012). Electronic fetal heart rate monitoring: Applying principles of patient safety. *American Journal of Obstetrics & Gynecology*, *206*(4), 278–283. http://dx.doi.org/10.1016/j.ajog.2011.08.016

Murray, M. L., & Huelsmann, G. M. (2007). Perinatal Morbidity and Mortality: Root Causes and Common Themes in Labor and Delivery Litigation. *Journal of Legal Nurse Consulting*, *18*(4), 13–18.

National Institute of Clinical Excellence. (2007). *Intrapartum care: Care of healthy women and their babies during childbirth*. London, United Kingdom: Author.

Neilson, J. P. (2012). Fetal electrocardiogram (ECG) for fetal monitoring during labour. *The Cochrane Database of Systematic Reviews*, *18*(4), CD000116. http://dx.doi.org/10.1002/14651858.CD00116.pub3

Nolan, M. L. (2009). Information giving and education in pregnancy: A review of qualitative studies. *The Journal of Perinatal Education*, *18*(4), 21–30.

O'Cathain, A., Thomas, K., Walters, S. J., Nicholl, J., & Kirkham, M. (2002). Women's perceptions of informed choice in maternity care. *Midwifery*, *18*, 136–144. http://dx.doi.org/10.1054/midw.0301

Odding, E., Roebroeck, M. E., & Stam, H. J. (2006). The epidemiology of cerebral palsy: Incidence, impairments and risk factors. *Disability and Rehabilitation*, *28*(4), 183–191. http://dx.doi.org/10.1080/09638280500158422

Ondeck, M. (2009). Ethics and childbirth educators: Do your values cause you ethical distress? *The Journal of Perinatal Education*, *18*(1), 41–47. http://dx.doi.org/10.1624/105812409X396228

Parer, J. T., King, T., Flanders, S., Fox, M., & Kilpatrick, S. J. (2006). Fetal acidemia and electronic fetal heart rate patterns: Is there evidence of an association. *Journal of Maternal Fetal and Neonatal Medicine*, *19*(5), 289–294. http://dx.doi.org/10.1080/14767050500526172

Rattray, J., Flowers, K., Miles, S., & Clarke, J. (2011). Foetal monitoring: A woman-centered decision-making pathway. *Women and Birth*, *24*, 65–71. http://dx.doi.org/10.1016/j.wombi.2010.08.003

Regan, M., & Liaschenko, J. (2007). In the mind of the beholder: Hypothesized effect of intrapartum nurses' cognitive frames of childbirth cesarean section rates. *Qualitative Health Research*, *17*, 612–624. http://dx.doi.org/10.1177/1049732307301610

Romano, A. M., & Lothian, J. A. (2008). Promoting, protecting, and supporting normal birth: A look at the evidence. *JOGNN*, *37*, 94–105. http://dx.doi.org/10.1111/J.1552-6909.2007.00210.x

The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. (2006). *Intrapartum fetal surveillance clinical guidelines*. Retrieved from www.ranzcog.edu/au

Saling, E. (1966). Amnioscopy and foetal blood sampling: Observations on foetal acidosis. *Archives of Disease in Childhood*, *41*, 472–476.

Sandelowski, M. (2000). Retrofitting technology to nursing: The case of electronic fetal monitoring. *Journal of Obstetrics, Gynecology, and Neonatal Nursing*, *29*(3), 316–324.

Sandin-Bojo, A. K., Larsson, B. W., & Hall-Lord, M. L. (2008). Women's perception of intrapartal care in relation to WHO recommendations. *Journal of Clinical Nursing*, *17*, 2993–3003.

Sholapurkar, S. L. (2010). Intermittent auscultation of fetal heart rate during labor—A widely accepted technique for low risk pregnancies: But are the current national guidelines robust and practical? *Journal of Obstetrics and Gynaecology*, *30*(6), 537–540. http://dx.doi.org/10.3109/01443615.2010.484108

Sleutel, M., Schultz, S., & Wyble, K. (2007). Nurses' views of factors that help and hinder their intrapartum care. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, *36*,

203–211. http://dx.doi.org/10.1111/J.1552-6909.2007.00146.x

Society of Obstetricians and Gynaecologists of Canada. (2007). Fetal health surveillance: Antepartum and Intrapartum Consensus Guidelines. *Journal of Obstetrics and Gynaecology Canada*, *29*(9), 1–55.

Tekin, A., Ozkan, S., Caliskan, E., Ozeren, S., Corakci, A., & Yucesoy, I. (2008). Fetal pulse oximetry: Correlation with intrapartum fetal heart rate patterns and neonatal outcome. *Journal of Obstetric and Gynaecologic Research*, *34*(5), 824–831.

Tumblin, A. (2007). How I teach evidence-based epidural information in a hospital and keep my job. *The Journal of Perinatal Education*, *16*(4), 68–69.

United States Department of Health and Human Services. (2004). Public use data file documentation: 2004 Period linked birth/infant death data set. *National Vital Statistics Reports*. Hyattsville, MD: National Center for Health Statistics.

United States Department of Health and Human Services. (2011). *Healthy People 2020.* Retrieved from http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=26

United States Preventative Services Task Force. (1996). *Screening for intrapartum electronic fetal monitoring.* Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from http://www.ahrq.gov/clinic/uspstf/uspsiefm.htm

Weiss, P. M., Balducci, J., Reed, J., Klasko, S. K., & Rust, O. A. (1997). Does centralized monitoring affect perinatal outcomes? *Journal of Maternal Fetal Medicine*, *6*(6), 317–319.

Williams, R., & Hawes, W. (1979). Cesarean section, fetal monitoring, and perinatal mortality in California. *American Journal of Public Health*, *69*(9), 864–870.

Withiam-Leitch, M., Shelton, J., & Fleming, E. (2006). Central fetal monitoring: Effect on perinatal outcomes and cesarean section rate. *Birth*, *33*(4), 284–288.

World Health Organization. (1996). *Care in normal birth: A practical guide*. Geneva, Switzerland: Author.

Wu, Y. W., & Colford, J. M. (2000). Chorioamnionitis as a risk factor for cerebral palsy. *Journal of the American Medical Association*, *284*(11), 1417–1424. http://dx.doi.org/10.1001/jama.284.11.1417

---

LISA HEELAN *is a Robert Wood Johnson New Jersey Nurse Scholar and a PhD nursing student at Seton Hall University.*