First Do No Harm: Interventions During Childbirth

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ABSTRACT

Although medical and technological advances in maternity care have drastically reduced maternal and infant mortality, these interventions have become commonplace if not routine. Used appropriately, they can be life-saving procedures. Routine use, without valid indications, can transform childbirth from a normal physiologic process and family life event into a medical or surgical procedure. Every intervention presents the possibility of untoward effects and additional risks that engender the need for more interventions with their own inherent risks. Unintended consequences to intrapartum interventions make it imperative that nurse educators work with other professionals to promote natural childbirth processes and advocate for policies that focus on ensuring informed consent and alternative choices. Interdisciplinary collaboration can ensure that intrapartum caregivers “first do no harm.”

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Florence Nightingale (1859) stated that “It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm” (p. iii). Nightingale’s admonition to “. . . do the sick no harm” is especially pertinent for maternity nurses. This is even more relevant with the increase in technology and interventions available today. Every nurse attending a childbearing woman must be mindful of the possible consequences and risks of each intervention he/she initiates to weigh

the possible benefits of the intervention against its potential detrimental effects for both mother and neonate. These consequences include the impact on length of hospitalization and its resulting increased costs, and the potential limitation on options for subsequent births. They also include the psychological impact of maternal feelings of failure and guilt. Care must be taken to maximize the use of preventive measures during the normal childbearing process to minimize the need for interventions.

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When interventions become necessary for valid indications, the mother must be made aware of both necessity and risks to give informed consent. The purpose of this article is to review the risks associated with common interventions in care of the childbearing woman, and to admonish health-care providers to thoughtfully consider these risks before each intervention.

SCENARIO

Cara is a G3P2 who went into labor spontaneously at 38.6 weeks. Upon admission to labor and delivery (L&D), she was put to bed and placed on electronic monitoring. A vaginal exam determined she was 3–4 cm dilated, 50% effaced, and at –1 station. Her contractions were every 3–5 minutes in frequency and 50–60 seconds in duration. Fetal heart tones were 150 with average variability and accelerations. Intravenous fluids were initiated, and she was instructed not to eat or drink anything except ice chips and hard candy. An hour after admission, Cara was uncomfortable and was offered an epidural. After the epidural was initiated, Cara was catheterized as needed. When Cara's contractions decreased in frequency and duration, the physician ordered an amniotomy and Pitocin augmentation. Cara's contractions increased in frequency, duration, and intensity. After 3 hours, Cara was completely dilated with the fetal head at 0 station, and the physician instructed Cara to begin to push. She was not feeling her contractions, so the epidural pump was turned off. Cara pushed for 2 hours but was only able to bring the head to a +2 station. The fetal tracing indicated prolonged variable decelerations and minimal variability. Faced with the option of either performing a cesarean surgery or an instrument birth, the physician opted to use vacuum extraction to assist the descent of the fetal head and cut a midline episiotomy. The infant had a tight nuchal cord but began to cry lustily with stimulation. Apgar scores were 8 at 1 minute and 9 at 5 minutes. The nurse completed the newborn assessment and procedures before briefly handing the baby to Cara then quickly took it to the nursery to begin intervention because of a maternal temperature of 100.9°F. Cara had planned to initiate breastfeeding shortly after birth as she had with her other babies. Cara's story is typical of patients seen in L&D units across the nation. Not only does each intervention interfere with normal processes but can also lead to deleterious outcomes. Romano and Lothian (2008) report that common labor practices interfere with

normal physiological processes. These interventions can include bed rest/recumbent position, electronic fetal monitoring (EFM), limited oral intake during labor, frequent vaginal exams, inductions/augmentations, amniotomy, regional anesthesia, catheterization, ineffective pushing, episiotomy, instrumental vaginal birth, and cesarean surgery.

BED REST/RECUMBENT POSITION

The first and most common intervention upon admission of a patient to labor is putting the woman to bed. Bed rest or the recumbent position can result in poor quality contractions, dystocia, slow dilatation and effacement, prolonged labor, and failure to descend. Laboring in the recumbent position can also result in maternal hypotension, vena cava syndrome, decreased uteroplacental blood flow, and late decelerations. The result can be an increased rate of cesarean surgeries because of fetal distress or failure to progress or descend. In addition, bed rest can cause more pain, necessitating additional analgesia and/or regional anesthesia (Zwelling, 2010).

Unrestricted movement during labor allows the mother to find a position that is more comfortable for her (Romano & Lothian, 2008). It has been found to decrease maternal pain, facilitate maternal–fetal circulation, increase the quality of uterine contractions, and facilitate fetal descent (Zwelling, 2010). Advocating for positions such as the knee-chest can reduce back pain related to posterior fetal position. The laboring woman should have the freedom to move around, change positions, and use the shower or bath to aid in pain relief (Adams & Bianchi, 2008).

The recumbent position also has disadvantages in the second stage of labor. This position increases the rate of instrumental births and episiotomies, increases pain, and increases cesarean surgeries (Zwelling, 2010). The Mayo Clinic (2012) suggests that the mother change positions frequently. Some of these positions include standing and swaying, rocking, leaning forward, kneeling over an exercise ball, squatting, or assuming a hands and knees position, thus allowing gravity to assist in descent of the fetal head. Stremler, Halpern, Weston, Yee, and Hodnett (2009) suggest a hands and knees position for patients with epidural analgesia. Changing maternal positions may also help to reduce maternal trauma and operative vaginal deliveries (Dudding, Vaizey, & Kamm, 2008; Zwelling, 2010). Position changes are often impeded by the use of continuous EFM.

ELECTRONIC FETAL MONITORING

The EFM has become a standard of care in most hospitals with obstetric units. It can either be intermittent or continuous. Continuous EFM not only restricts a laboring patient's movements but can also result in higher rates of cesarean surgeries and vacuum extractions among low-risk laboring women. The EFM can either be accomplished non-invasively with external monitoring or invasively with internal monitoring. Internal monitoring poses a risk of infection for the mother as well as the fetus, who is 2.5 times more likely to contract an infection (Walden, 2009).

Continuous fetal monitoring should be reserved for high-risk pregnancies because continuous EFM can prevent maternal position changes, comfort measures such as soothing baths, and the focus on the laboring woman who may be ignored in deference to the monitor tracing (Alfirevic, Devane, & Gyte, 2008). The use of continuous EFM may restrict position changes, impede infant rotation, and add to the anxiety of the birthing process that may lead to the shunting of blood away from the uterus. This shunting can result in fetal hypoxia (Ward, 2001). In addition to changing positions and reserving the use of EFM for high-risk cases, withholding oral intake has been shown to have few advantages.

LIMITED ORAL INTAKE DURING LABOR

Lack of nutritional support during labor can cause maternal dehydration, ketosis, hyponatremia, and increased maternal stress (American College of Nurse-Midwives, 2008; Sharts-Hopko, 2010). The American College of Nurse-Midwives (2008) encourages the provision of nutrition to low-risk patients in labor to prevent ketosis and other problems associated with keeping a patient on a nothing by mouth (NPO) diet. Oral nutrition during labor does not influence either obstetric or neonatal outcomes (O'Sullivan, Liu, Hart, Seed, & Shennan, 2009). Another intervention as common as limiting oral intake from the woman is frequent vaginal examinations.

FREQUENT VAGINAL EXAMS

Vaginal exams by nurses and/or physicians are common in determining cervical changes in labor, but it is recommended that vaginal exams be limited. Vaginal examinations put the laboring woman at risk for chorioamnionitis (Maharaj, 2007; Zanella et al., 2010) and puerperal infections (Sebitloane,

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Moodley, & Esterhuizen, 2008), and may impact future fertility (Maharaj, 2007). Seven or more vaginal exams during labor make the newborn 4.5 times more likely to contract neonatal sepsis and require longer hospital stays because of antibiotic therapy (Sebitloane et al., 2008). Newborns are more likely to contract group B streptococcus when numerous vaginal exams are performed. Antibiotic use for these infections may also increase allergies and asthma as well as cause antimicrobial resistance (World Health Organization [WHO], 2011). Repeated vaginal exams may further restrict the patient's movement, resulting in poor quality contractions and the possibility of augmentation of labor.

INDUCTION/AUGMENTATION

Pitocin inductions, often preceded by prostaglandin insertions for cervical ripening, may cause a more rapid onset of painful contractions resulting in increased use of regional anesthesia (Simpson & Atterbury, 2003). They are associated with uterine hyperstimulation, uterine rupture, and fetal distress (WHO, 2011). Fetal acidosis, as a result of uterine hyperstimulation, also puts the fetus at risk (Su, Tsai, Huang, Luo, & Lin, 2008). Because of the associated risks, continuous EFM is required, which compromises positioning and comfort measures. Pitocin inductions and augmentations also put the laboring woman at risk for cervical injury, which can affect subsequent pregnancies (Melamed, Ben-Harosh, Chen, Kaplan, & Yogev, 2009). Prenatal education about the risks of elective induction may help reduce the trend of labor inductions. If a labor induction is not effective, amniotomy is often performed on the pregnant woman to augment a slowly progressing labor.

AMNIOTOMY

Intact membranes buffer the baby's head from the intensity of the contractions as well as facilitate dilation (Royal College of Midwives [RCM], n.d.). The Cochrane Collaboration (2008) found no benefit to

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artificially rupturing membranes as a mechanism for speeding up the labor process. Often, artificial rupture of membranes results in adverse outcomes such as a prolapsed cord (Cochrane Collaboration, 2008), fetal injury or bleeding from an undiagnosed vasa previa, or maternal or fetal infection related to a prolonged labor (Cochrane Collaboration, 2008; Smyth, Aldred, & Markham, 2011). Because of the risk of infection, once an amniotomy is performed there is commitment to an outcome. Prolonged labor after amniotomy or fetal distress increases the risk of a cesarean surgery (Cochrane Collaboration, 2008). It is imperative that prenatal educators inform clients of the risks of artificial rupture of membranes. Another intervention in labor is regional anesthesia, which is popular and commonplace but is not entirely benign.

REGIONAL ANESTHESIA

Regional anesthesia carries risks for both the mother and her neonate. It can result in poor quality contractions, prolonged first stage of labor (Leighton & Halpern, 2002), and prolonged second stage of labor (Cambic & Wong, 2010; Dudding et al., 2008). Regional anesthesia results in increased use of Pitocin augmentation (Leeman, Fontaine, King, Klein, & Ratcliffe, 2003; Leighton & Halpern, 2002), instrument-assisted birth, and/or cesarean surgery (Cambic & Wong, 2010). Patients receiving regional anesthesia experience an increased incidence of elevated temperature (Goetzel, Evans, Rivers, Suresh, & Lieberman, 2002; Leighton & Halpern, 2002), and an increased incidence of low backache (Leighton & Halpern, 2002). Infants of mothers receiving epidural anesthesia also have a higher incidence of fever (Ransio-Arvidson et al., 2001) and neonatal sepsis (Lieberman & O'Donoghue, 2002). Epidurals interfere with the neonate's spontaneous breast-seeking and breastfeeding behaviors and have a negative impact on breastfeeding in the first 24 hours, leading to more supplementation in the hospital and delays in lactogenesis (Baumgarder, Muehl, Fischer, & Pribbenow, 2003; Ransio-Arvidson et al., 2001). With regional anesthesia, the mother may also

experience urinary retention, overdistended bladder, and lengthened bladder recovery (Gadsden, Hart, & Santos, 2005) resulting in a need for catheterization.

CATHETERIZATION

Catheterization is a common practice in the intrapartum period, often necessitated by regional anesthesia or cesarean surgery. Catheterization puts the mother at risk of urinary tract infection (UTI; Li, Wen, Wang, Li, & Li, 2010; Madeo & Roodhouse, 2009; Nasr et al., 2009). Antibiotic use for UTIs may increase allergies, asthma, and yeast infections (American Academy of Allergy, Asthma, & Immunology, 2011; WHO, 2011). Nasr et al. (2009) contend that the mean time to ambulation, first postoperative voiding, oral rehydration, and intestinal movement are increased in patients with indwelling catheters during cesarean surgeries. The duration and cost of their hospital stay is also increased (Nasr et al., 2009; Robinson, 2009). Nasr also found that women with indwelling catheters for cesarean surgery had a higher incidence of UTIs, took longer to void resulting in increased hospital stay, and reported less satisfaction with the birth experience, and suggest noncatheterization during cesarean surgeries. Li et al. (2010) determined that noncatheter use resulted in less pain during the first void after surgery as well as less time until first voiding. Not only does regional anesthesia necessitate catheterizations, but it also has a negative impact on pushing.

INEFFECTIVE PUSHING

In many institutions, once dilation is complete, the laboring woman is placed in a supine position, often in stirrups, and is instructed to push using a closed glottis method during the contractions. The traditional closed glottis pushing can lead to suboptimal umbilical cord gases (Yildirim & Kizilkaya, 2008) and fetal oxygen desaturation and acidosis (Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN), 2007; Simpson, 2006). This technique of pushing often results in maternal fatigue and increased perineal trauma (Simpson, 2006). There is a physiological resting stage that occurs once the mother has fully dilated (AWHONN, 2007). Contractions may become stronger and longer in duration but

decrease in frequency. This period will allow the mother and fetus to rest before beginning to push with contractions. Once the contractions increase in frequency, the mother may feel the urge to push, at which time the pushing will be more effective and less tiring. This concept of “laboring down” or delayed pushing allows the fetus to descend naturally without having the mother push with contractions. This allows the mother to rest and begin pushing when the head is lower in the birth canal, thus preventing maternal exhaustion (Brancato, Church, & Stone, 2008; Cambic & Wong, 2010).

With epidurals, delayed pushing shortens the second stage of labor as well as decreases operative interventions (Gillesby et al., 2010). Pushing can be delayed up to 2 hours for nulliparas and 1 hour for multiparas (Simpson, 2006). It is important to include the mother in the decision of when to push (AWHONN, 2007). It is also important to facilitate an upright pushing position whether that be sitting, squatting, or standing. Letting the mother push naturally when and how if she has the urge might avoid instrumental vaginal births and other operative interventions.

EPISIOTOMY/INSTRUMENTAL VAGINAL BIRTH

Prolonged second stage (Cambic & Wong, 2010; Dudding et al., 2008) and premature pushing (Brancato et al., 2008) puts the laboring woman at risk of forceps or vacuum extraction. Instrumental vaginal birth can increase the incidence of episiotomy, episiotomy extensions, or perineal lacerations (Cambic & Wong, 2010; Dudding et al., 2008; Mola & Kuk, 2010; Yeomans, 2010) and anal sphincter lacerations (Dudding et al., 2008; Kudish, Sokol, & Kruger, 2008). Episiotomy and/or perineal lacerations increase the mother’s risk of pain, infection, and hemorrhage, and prolong recovery time (MacLeod et al., 2008). The long-term risks of fecal incontinence or pudendal nerve damage (Fitzpatrick et al., 2002), urinary incontinence, and dyspareunia (Hall, McCracken, Osterwell, & Guise, 2003; Liebling et al., 2004) are also increased with instrumental vaginal birth.

Besides the maternal risks of forceps or vacuum-assisted birth, there are risks for the neonate. With operative vaginal birth, there is an increased risk of neonatal cephalohematoma, retinal hemorrhage,

and facial nerve damage (Hook & Damos, 2008; Smith & Kroeger, 2011; Yeomans, 2010). Vacuum extraction can cause subgaleal hematomas leading to shock and exsanguinations (Mola & Kuk, 2010; Yeomans, 2010). Instrument or vacuum-assisted birth exerts mechanical forces on the infant’s head that can cause nerve damage associated with a poor suck and early cessation of breastfeeding (Smith & Kroeger, 2011). Operative vaginal birth can lead to lower Apgar scores, more days spent in special care (with its associated increased costs), and more neonatal deaths (Mola & Kuk, 2010).

Those involved in operative birth must recognize and minimize risk factors for maternal and infant trauma (Yeomans, 2010). Interventions resulting in operative vaginal birth can also increase the incidence of an emergency cesarean surgery (Thorsell, Lyrenas, Andolf, & Kaijser, 2011).

CESAREAN SURGERY

At 31% of births, cesarean surgery rates are higher than what is recommended (Centers for Disease Control and Prevention [CDC], 2007). The WHO recommends a rate no higher than 10%–15% (Chaillet et al., 2012). Cesarean surgery rates have steadily increased over the last several years. Cesarean surgeries are performed as a matter of convenience for the physician or at the request of the patient (Harasim, 2012). The WHO has identified several reasons why this may be so. Maternal preference for a surgical birth, less experienced physician and nursing personnel, fear of litigation, ineffective prenatal education, and staffing issues are few of the factors contributing to the increase. This suggests that health-care workers need to analyze and modify their practices as well as to identify barriers to reducing cesarean rates. There is a clear implication here for childbirth and prenatal educators to be more proactive in educating women about the risks of cesarean surgery.

Although surgical birth can be a life-saving procedure, it is not without risks. These risks must be declared when obtaining informed consent.

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Unintended consequences of typical intrapartum interventions make it imperative that educators work with nurses, physicians, and anesthesiologists to promote natural processes for childbirth and advocate for policies that focus on ensuring informed consent and alternative choices.

Cesarean surgeries result in increased pain, including headache and backache, as well as increased risk of hemorrhage and uterine rupture (Herbruck, 2008). Because of the risk of uterine rupture with subsequent pregnancies and deliveries, the mother's future choices of birthing options may be limited. There is also a higher incidence of puerperal infection (Maharaj, 2007) and maternal sepsis with surgical birth (van Dillen, Zwart, Schutte, & van Roosmalen, 2010). Cesarean surgery results in greater risk of bladder injury as well as increased risk of postpartum bladder infection or incontinence (Herbruck, 2008; Rahman et al., 2009). Cesarean surgeries increase the incidence of subsequent placenta previa and other placental and uterine problems (Herbruck, 2008) as well as scarring and adhesions (Bernstein, 2005). Because of the increased complications associated with cesarean surgery, patients are more likely to be readmitted to the hospital (Herbruck, 2008).

Cesarean surgeries also pose risks to the neonate. MacDormank, Declercq, Menacker, and Malloy (2008) reported a 69% higher incidence of fetal deaths in cesarean surgeries versus vaginal births. Besides the chance of inadvertent preterm birth, with all of its inherent hazards, there is also a chance of fetal laceration, neonatal respiratory difficulties, inadequate transition to birth (Herbruck, 2008), and increased incidence of mechanical ventilation and pneumothorax (Benterud, Sandvik, & Lindemann, 2009). Compared to vaginal birth, cesarean surgery results in less maternal-infant contact (Chalmers et al., 2010), delayed bonding (Herbruck, 2008), delay in putting the infant to the breast, and other less optimal breastfeeding practices (Zanardo et al., 2010) that lead the mother to choose not to breastfeed (Chertok & Shoham-Vardi, 2008) or discontinue breastfeeding prematurely (Herbruck, 2008).

ILLUSTRATION

To illustrate the cascading events triggered by interventions during the childbirth process, the example of bed rest can be considered (Figure 1). The simple act of putting the laboring woman to bed can result in slow, poor quality contractions. This may necessitate augmentation of labor, which requires electronic monitoring. The Pitocin used for augmentation may cause more painful contractions, which can necessitate regional anesthesia. The regional anesthesia may result in urinary retention requiring repeated catheterization, which puts the laboring woman at risk of UTI and the use of antibiotics resulting in prolonged hospitalization and increased hospital costs.

The regional anesthesia can lead to prolonged labor and ineffective pushing, requiring forceps birth or vacuum extraction, which may necessitate an episiotomy or result in vaginal or perineal lacerations. A prolonged labor with failure to progress or a failed instrumental vaginal birth may result in a cesarean surgery. Both instrumental birth and cesarean surgery lead to increased risk of pain, infection, and hemorrhage; and the use of additional pharmacological agents to treat these problems can prolong recovery. Regional anesthesia puts the infant at risk for respiratory and feeding problems. Cesarean surgery also puts the infant at risk for respiratory and feeding problems leading to prolonged hospitalization and increased hospital costs.

Internal electronic monitoring may result in chorioamnionitis/endometritis and/or neonatal sepsis requiring antibiotics for both the mother and the neonate. Pitocin augmentation can also decrease sensitivity to oxytocin resulting in increased risk of postpartum hemorrhage and poor milk ejection reflex. Hemorrhage can lead to maternal anemia and a poor milk supply as well as a decreased motivation to breastfeed. Poor milk ejection reflex can contribute to a reduced milk supply, leading to failure to thrive, or to premature cessation of breastfeeding.

IMPLICATIONS FOR CHILDBIRTH EDUCATORS

Every nurse attending a childbearing woman must recognize the possible consequences and risks of each intervention he/she initiates to weigh the possible benefits against its potential detrimental

Figure 1. An illustration of cascading events using bed rest as an intervention. UTI = urinary tract infection.

effects. Care must be taken to enhance normal childbirth processes to minimize the need for interventions. When interventions become necessary for valid indications, the nurse must make the mother aware of the necessity as well as the risks so that she can give informed consent. The nurse must also use appropriate precautions to ensure that interventions do not impose unnecessary risks

for the patient. Unintended consequences of typical intrapartum interventions make it imperative that educators work with nurses, physicians, and anesthesiologists to promote natural processes for childbirth and advocate for policies that focus on ensuring informed consent and alternative choices. Interdisciplinary collaboration is necessary to ensure that intrapartum caregivers “first do no harm.”

REFERENCES

- Adams, E., & Bianchi, A. (2008). A practical approach to labor support. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 37, 106–115.
- Alfirevic, Z., Devane, D., & Gyte, G. (2008). Continuous cardiotocography (CTG) as a form of electronic fetal monitoring (EFM) for fetal assessment during labour. *Cochrane Database of Systematic Reviews* 2006, (3). Art. No.: CD006066. <http://dx.doi.org/10.1002/14651858.CD006066>
- American Academy of Allergy, Asthma, & Immunology. (2011). *Increasing rates of allergies and asthma*. Retrieved from <http://www.aaaai.org/conditions-and-treatments/Library/Allergy-Library/Prevalence-of-Allergies-and-Asthma.aspx>
- American College of Nurse-Midwives. (2008). Providing oral nutrition to women in labor. *Journal of Midwifery & Women's Health*, 53(3), 276–283.
- Association of Women's Health, Obstetric and Neonatal Nurses. (2007). Evidence-based clinical practice guidelines: Nursing management of the second stage of labor. *Agency for Healthcare Research and Quality*. Retrieved from <http://www.guidelines.gov/content.aspx?id=24064>
- Baumgardner, D., Muehl, P., Fischer, M., & Pribbenow, B. (2003). Effect of labor epidural anesthesia on breastfeeding of healthy full-term newborns delivered vaginally. *Journal of the American Board of Family Practice*, 16(1), 7–13.
- Benterud, T., Sandvik, L., & Lindemann, R. (2009). Cesarean section is associated with more frequent pneumothorax and respiratory problems in the neonate. *Acta Obstetrica et Gynecologica*, 88, 359–361.
- Bernstein, P. (2005). Risks associated with cesarean delivery. *Medscape Education*. Retrieved from http://www.medscape.org/viewarticle/512946_4
- Brancato, R. M., Church, S., & Stone, P. W. (2008). A meta-analysis of passive descent versus immediate pushing in nulliparous women with epidural analgesia in the second stage of labor. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 37, 4–12.
- Cambic, C., & Wong, C. (2010). Labor analgesia and obstetric outcomes. *British Journal of Anaesthesia*, 105(5), 150–160.
- Centers for Disease Control and Prevention. (2007). Births: Final data for 2005. *National Vital Statistics Report*, 56(6). Retrieved from http://www.cdc.gov/nchs/data/nvsr/nvsr56/nvsr56_o6.pdf
- Chaillet, N., Dube, E., Dugas, M., Francoeur, D., Dube, J., Gagnon, S., & Poitras, L. (2012). *Identifying barriers and facilitators towards implementing guidelines to reduce caesarean section rates in Quebec*. World Health Organization. Retrieved from <http://www.who.int/bulletin/volumes/85/10/06-039289/en/>
- Chalmers, B., Kaczorowski, J., Darling, E., Heaman, M., Fell, D., O'Brien, B., & Lee, L. (2010). Cesarean and vaginal birth in Canadian women: A comparison of experiences. *Birth*, 37(1), 44–49.
- Chertok, I., & Shoham-Vardi, I. (2008). Infant hospitalization and breastfeeding post-cesarean section. *British Journal of Nursing*, 17(12), 786–791.
- Cochrane Collaboration. (2008). Amniotomy for shortening spontaneous labour. *Cochrane Library*, 4, 1–76.
- Dudding, T. C., Vaizey, C. J., & Kamm, M. A. (2008). Obstetric anal sphincter injury: Incidence, risk factors, and management. *Annals of Surgery*, 247(2), 224–237.
- Fitzpatrick, M., Harkin, R., McQuillan, K., O'Brien, C., O'Connell, P. R., & O'Herlihy, C. (2002). A randomized clinical trial comparing the effects of delayed versus immediate pushing with epidural analgesia on mode of delivery and faecal continence. *BJOG: An International Journal of Obstetrics and Gynaecology*, 109, 1359–1365.
- Gadsden, J., Hart, S., & Santos, A. (2005). Post-cesarean delivery analgesia. *Anesthesia & Analgesia*, 101(5), 562–569.
- Gillesby, E., Burns, S., Dempsey, A., Kirby, S., Mogensen, K., Naylor, K., . . . Whelan, B. (2010). Comparison of delayed versus immediate pushing during second stage of labor for nulliparous women with epidural anesthesia. *Journal of Obstetric, Gynecological, and Neonatal Nurses*, 39, 635–644.
- Goetzl, L., Evans, T., Rivers, J., Suresh, M., & Lieberman, E. (2002). Elevated maternal and fetal serum interleukin-6 levels are associated with epidural fever. *American Journal of Obstetrics and Gynecology*, 187(4), 834–838.
- Hall, W., McCracken, K., Osterwell, P., & Guise, J. (2003). Frequency and predictors for postpartum fecal incontinence. *American Journal of Obstetrics and Gynecology*, 188, 1205–1207.
- Harasim, P. (2012). C-sections: Some question whether surgery occurs only for medical necessity. *Texas Nurses Association, Nursing Flash*. Retrieved from http://www.nursingnewsflash.com/texasnurses/Story.nsp?story_id=171035608
- Herbruck, L. (2008). The impact of childbirth on the pelvic floor. *Urologic Nursing*, 28(3), 173–184.
- Hook, C., & Damos, J. (2008). Vacuum-assisted vaginal delivery. *American Family Physician*, 78(8), 953–960.
- Kudish, B., Sokol, R., & Kruger, M. (2008). Trends in major modifiable risk factors from severe perineal trauma, 1996–2006. *International Journal of Gynecology & Obstetrics*, 102, 165–170.
- Leeman, L., Fontaine, P., King, V., Klein, M., & Ratcliffe, S. (2003). The nature and management of labor pain: Part II—Pharmacologic pain relief. *American Family Physician*, 68(6), 1115–1120.
- Leighton, B., & Halpern, S. (2002). The effects of epidural analgesia on labor, maternal, and neonatal outcomes: A systematic review. *American Journal of Obstetrics and Gynecology*, 186(5), S69–S77.
- Lieberman, E., & O'Donoghue, C. (2002). Unintended effects of epidural analgesia during labor. *Journal of Obstetrics and Gynecology*, 186(Suppl. 5), S31–S68.

- Li, L., Wen, J., Wang, L., Li, Y. P., & Li, Y. (2010). Is routine indwelling catheterization of the bladder for caesarean section necessary? A systematic review. *British Journal of Obstetrics & Gynaecology*, 118(4), 400–409.
- Liebling, R., Swinger, R., Patel, R., Verity, L., Soothill, P., & Murphy, D. (2004). Pelvic floor morbidity up to one year following difficult instrumental vaginal delivery and Caesarean section in the second stage of labor: A cohort study. *American Journal of Obstetrics and Gynecology*, 191, 4–10.
- MacDormank, M., Declercq, E., Menacker, F., & Malloy, M. (2008). Neonatal mortality for primary cesarean and vaginal births to low-risk women: Application of an “intention-to-treat” model. *Birth*, 35(1), 3–8.
- MacLeod, M., Strachan, B., Bahl, R., Howarth, L., Goyder, K., Van de Venne, M., & Murphy, D. (2008). A prospective cohort study of maternal and neonatal morbidity in relation to use of episiotomy at operative vaginal delivery. *BJOG: An International Journal of Obstetrics and Gynaecology*, 115, 1688–1694.
- Madeo, M., & Roodhouse, A. (2009). Reducing the risks associated with urinary catheters. *Nursing Standard*, 23(29), 47–55.
- Maharaj, D. (2007). Puerperal pyrexia: A review, Part 1. *Obstetrical and Gynecological Survey*, 62(6), 393–399.
- Mayo Clinic. (2012). *Labor positions*. Retrieved from <http://www.mayoclinic.com/health/labor/PR00141>
- Melamed, N., Ben-Harosh, A., Chen, R., Kaplan, B., & Yoge, Y. (2009). Intrapartum cervical lacerations: Characteristics, factors, and effects on subsequent pregnancies. *American Journal of Obstetrics and Gynecology*, 200, 388–389.
- Mola, G., & Kuk, J. (2010). A randomized controlled trial of two instruments for vacuum assisted delivery (Vacca Re-Usable OmniCup and the Bird anterior and posterior cups) to compare failure rates, safety and use effectiveness. *The Australian & New Zealand Journal of Obstetrics & Gynaecology*, 50, 246–252.
- Nasr, A., ElBigawy, A., Abdelamid, A., Al-Khulaidi, S., Al-Inany, H., & Sayed, E. (2009). Evaluation of the use versus non-use of urinary catheterization during caesarean delivery: A perspective, multi-center, randomized controlled trial. *Journal of Perinatology*, 29(6), 416–421.
- Nightingale, F. (1859). *Notes on hospitals*. London, England: John W. Parker and Sons.
- O’Sullivan, G., Liu, B., Hart, D., Seed, P., & Shennan, A. (2009). Effect of food intake during labour on obstetric outcome: Randomised controlled trial. *British Medical Journal*, 338, b784. Retrieved from http://www.bmj.com/highwire/filestream/376813/field_highwire_article_pdf/0.pdf
- Rahman, M., Gasse, T., Al Suleiman, S., Al Jama, F., Burshaid, S., & Rahman, J. (2009). Bladder injuries during cesarean section in a University Hospital: A 25-year review. *Archives of Gynecology and Obstetrics*, 279(3), 349–352.
- Ransio-Arvidson, A., Matthiesen, A., Lilja, G., Nissen, E., Widstrom, A., & Uvnas-Moberg, K. (2001). Maternal analgesia during labor disturbs newborn behavior: Effects on breastfeeding, temperature, and crying. *Birth*, 28(1), 5–12.
- Robinson, J. (2009). Urinary catheterization: Assessing the best options for patients. *Nursing Standard*, 23(29), 40–45.
- Romano, A., & Lothian, J. (2008). Promoting, protecting, and supporting normal birth: A look at the evidence. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 37(1), 94–105.
- Royal College of Midwives. (n.d.). *Rupturing membranes*. Retrieved from <http://www.remnormalbirth.org.uk/stories/on-the-crest-of-a-wave/rupturing-membranes/>
- Sebitloane, H., Moodley, J., & Esterhuizen, T. (2008). Prophylactic antibiotics for the prevention of postpartum infectious morbidity in women infected with human immunodeficiency virus: A randomized controlled trial. *American Journal of Obstetrics and Gynecology*, 198, 189.e1–189.e6.
- Sharts-Hopko, N. (2010). Oral intake during labor: A review of the evidence. *The American Journal of Maternal Child Nursing*, 35(4), 197–203.
- Simpson, K. (2006). When and how to push: Providing the most current information about second-stage labor to women during childbirth education. *Journal of Perinatal Education*, 15(4), 6–9.
- Simpson, K., & Atterbury, J. (2003). Trends and issues in labor induction in the United States: Implications for clinical practice. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 32(6), 767–779.
- Smith, L., & Kroeger, M. (2011). *Impact of birthing practices on breastfeeding*. Sudbury, MA: Jones & Bartlett.
- Smyth, R., Aldred, S., & Markham, C. (2011). *Amniotomy for shortening spontaneous labour*. Cochrane Pregnancy and Childbirth Group. Retrieved from <http://online.library.wiley.com/doi/10.1002/14651858.CD006167.pub2/abstract?systemMessage=Wiley+Online+Library+will+b>
- Stremmler, R., Halpern, S., Weston, J., Yee, J., & Hodnett, E. (2009). Hands-and-knees positioning during labor with epidural analgesia. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 38(4), 391–398.
- Su, C., Tsai, H., Huang, C., Luo, K., & Lin, L. (2008). Fetal acidosis from obstetric interventions during the first vaginal delivery. *Taiwan Journal of Obstetrics and Gynecology*, 47(4), 397–401.
- Thorsell, M., Lyrenas, S., Andolf, E., & Kaijser, M. (2011). Induction of labor and the risk for emergency cesarean section in nulliparous and multiparous women. *Acta Obstetrica et Gynecologica Scandinavica*, 90(10), 1094–1099.
- van Dillen, J., Zwart, J., Schutte, J., & van Roosmalen, J. (2010). Maternal sepsis: Epidemiology, etiology, and outcome. *Current Opinion in Infectious Diseases*, 23(3), 249–254.

- Walden, R. (2009). ACOG offers mixed bag of practice guidelines. *National Women's Health Network, November/December*. Retrieved from <http://nwhn.org/acog-offers-mixed-bag-practice-guidelines>
- Ward, J. (2001). The evolution of electronic fetal monitoring from use in high-risk women to routine practice: A critical historical perspective. Student projects: Qualitative research proposal. Retrieved from <http://www.instituteofmidwifery.org?MSFinalProj.nsf/a9ee58d7a8239676825>
- World Health Organization. (2011). *WHO recommendations for induction of labor*. Geneva, Switzerland: Author.
- Yeomans, E. (2010). Operative vaginal delivery. *Obstetrics and Gynecology*, 115(3), 645–653.
- Yildirim, G., & Kizilkaya, B. (2008). Effect of pushing techniques in birth on mother and fetus: A randomized study. *Birth*, 35(1), 25–30.
- Zanardo, V., Svegliado, G., Cavallin, F., Giustardi, A., Cosmi, E., Litta, P., & Trevisanuto, D. (2010). Elective cesarean delivery: Does it have an effect on breastfeeding? *Birth*, 37(4), 275–279.
- Zanella, P., Bogana, G., Ciullo, R., Zamboni, A., Serena, A., & Albertin, M. (2010). Chorioamnionitis in the delivery room. *Minerva Pediatrica*, 62(3), 151–153.
- Zwelling, E. (2010). Overcoming the challenges: Maternal movement. *The American Journal of Maternal/Child Nursing*, 35(2), 72–80.

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