Breastfeeding education and support needs for women after a cesarean delivery or epidural anesthesia

Joy Petzoldt-Hansell

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Breastfeeding Education and Support Needs for Women after a Cesarean Delivery or Epidural Anesthesia

by

Joy Petzoldt-Hansell

Thesis
Submitted to the School of Health Sciences
Eastern Michigan University
in partial fulfillment of the requirements

for the degree of

MASTER OF SCIENCE
in
Human Nutrition

Thesis Committee:

Alice Jo Rainville, Ph.D, R.D, C.H.E, S.N.S, F.A.N.D, Chair
Judi Brooks, Ph.D, R.D.
Debby Busick, R.D, M.S, I.B.C.L.C.

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Ypsilanti, Michigan
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Abstract

Cesarean delivery and epidural anesthesia may require specific education and interventions for breastfeeding success. The objective of this study was to examine the prevalence of breastfeeding initiation and duration and explore specific breastfeeding needs for women who have had a Cesarean delivery or epidural anesthesia. Sixteen postpartum women aged 27 to 41 were recruited through a Lamaze center in Michigan. The women were interviewed with a questionnaire exploring their breastfeeding experiences and support needs after delivery, and use of artificial infant milk. All women initiated breastfeeding; 81% (n=13) breastfed their infant for at least 12 months. Cesarean delivery was associated with specialized breastfeeding needs, but epidural anesthesia by itself was not. Eighty-two percent (n=9) of infants born via Cesarean delivery received artificial infant milk, while only one of the women who had epidural anesthesia gave her infant artificial infant milk. Women who have Cesarean deliveries may require additional breastfeeding interventions.
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Chapter 1: Introduction and Background

Introduction

Health care has received a lot of attention lately in the United States. Evidence-based practices for treatments are increasingly recommended within the health care setting. While rates of obesity and chronic diseases are on the rise, the health care and public health communities are looking for ways to reverse this trend, promote better health outcomes, and cut health care costs. One specific health behavior that has been proven again and again to promote good health over the lifespan is for women to breastfeed their infants. Breastfeeding has been shown to reduce rates of Sudden Infant Death Syndrome (SIDS), infectious diseases, and asthma in infants, as well as reduce the infant’s risk of developing diabetes, obesity, and hypercholesterolemia later on in life. Breastfeeding also reduces the mother’s risk for developing certain cancers such as breast and ovarian and may reduce the risk of developing osteoporosis. Breastfeeding can save health care dollars and can lead to positive health outcomes now and in the future. Aside from the many additional health benefits to breastfeeding, breast milk is the most complete nutrition for infants.

Breastfeeding has become a more accepted method of infant feeding in the United States over the past several decades. Breastfeeding initiation rates have increased from 28% in 1972 to 78% in 2008. According to the National Immunization Surveys, 49% of infants born in 2010 were still being breastfed at six months of age. This was an increase from 35% in 2000. The U.S. breastfeeding rates at 12 months of age have also increased from 16% to 27% between the years 2000 to 2010. However, there is still more work to be done. The breastfeeding objectives of Healthy People 2020 aim for 81.9% of all infants to be breastfed at some time during their
infancy, 60.6% of infants to still be breastfeeding at six months of age, and 34.1% of infants to still be breastfeeding at 12 months of age.

More mothers are realizing how important breastfeeding is for their baby, but they still face barriers. These barriers may mean the difference between successful breastfeeding and a mother giving in to solely feeding artificial infant milk (AIM). One specific barrier that may affect breastfeeding rates includes mothers undergoing a cesarean delivery (CD) or epidural anesthesia (EA) at time of delivery. Studies have shown that rates of CD are on the rise and at an all-time high in the United States. A study done by HealthGrades\textsuperscript{5} found that CD rates rose from 27\% to 34\% of all single births between the years 2002 to 2009. According to the American Pregnancy Association,\textsuperscript{6} more than 50\% of women delivering at a hospital receive epidural anesthesia. A 2008 report from the Center for Disease Control and Prevention (CDC)\textsuperscript{7} found that 61\% of women within the 27 states included in this study had EA administered during their labor. If CD rates are on the rise in the U.S. and EA rates are common among women, could these procedures impact breastfeeding rates?

**Definition of Terms**

Breastfeeding barriers: Any factor that may hinder a mother from reaching her breastfeeding goals.

Breastfeeding initiation: The first time an infant is put to their mother’s breast for a feeding.

Breast milk “coming in”: A rapid increase in volume of breast milk produced, typically occurring three to four days after delivery, where breast milk begins the transition from colostrum to mature breast milk.\textsuperscript{8}
Cesarean Delivery (CD): A surgical procedure where a baby is delivered via an incision in the mother’s abdomen and uterus.

Epidural Anesthesia (EA): A method of pain management used during labor in which a local anesthetic and a narcotic or opioid are injected into the epidural space of the spinal cord, decreasing sensation and improving pain management in the patient’s body below the injection site.

Lactation consultant: A breastfeeding professional that has achieved 90 hours of lactation education, 1,000 hours of clinical breastfeeding experience, and has passed the International Board of Certified Lactation Consultants (IBCLC) exam.

La Leche League: A non-profit group that advocates for breastfeeding and is a breastfeeding resource for mothers.

LATCH Breastfeeding Charting System: A charting system that uses the acronym LATCH to assess how breastfeeding is going and assigns a score to each area of assessment; the higher the score, the more positive the breastfeeding outcome. L is for how the infant latches, A is for the audibility of the infant swallowing, T is for type of nipple that the mother has, C is for the level of comfort that the mother has, and H is for the amount of support given to the mother to hold her infant to her breast.\(^9\)

Cross-craddle breastfeeding position: A breastfeeding position where a mother holds her infant’s head in one hand and supports the infant’s body with that arm. She then crosses the infant’s body across hers and nurses the infant on the breast of the opposite side.\(^{10}\)
Side-lying breastfeeding position: A breastfeeding position where the mother and infant lie on their sides parallel to each other and facing each other while nursing.

Skin-to-skin: The action of a mother holding her unclothed infant on her bare chest.

Supplemental Nursing System (SNS): A feeding device where a thin feeding tube attaches to the mother’s nipple, providing either pumped breast milk or AIM at the breast, encouraging the infant to suckle.

**Barriers to Breastfeeding**

There are several factors for mothers who have undergone a CD that may create barriers to breastfeeding and contribute to early introduction of AIM. Mothers may end up having the first nursing session postponed since the baby is delivered via surgical intervention. Depending on the hospital, policies may prevent early initiation of breastfeeding. When breastfeeding is not initiated shortly after birth, breastfeeding success may be affected. In a study published by the *American Journal of Maternal Child Nursing*, Komara and colleagues\(^\text{11}\) found that 89% of mothers (n=58) who breastfed within the first hour of their infant’s life felt that they could continue to nurse their infants. More of the mothers (n=45) who had not initiated breastfeeding within the first hour started AIM supplementation. When the mother and infant are separated at the hospital, this works against the mother responding to her infant’s cues and putting him/her to her breast. Lauwers and Swisher\(^\text{12}\) recommend having the mother and infant room-in together to facilitate more opportunities for breastfeeding. For women who are recovering from a CD, they recommend a support person stay with the mother, as this may allow them access to earlier
rooming-in. Otherwise mother and infant may need to wait on rooming-in until nursing staff are available.

Mothers are often heard saying that their milk did not “come in” right away after their CD, so they ended up giving a bottle of AIM in the meantime. According to Lauwers and Swisher\textsuperscript{12} a CD does not affect a mother’s ability to breastfeed, but it may delay the initiation of stage II lactogenesis. Stage II lactogenesis is typically initiated between day two and day five postpartum. During this time the colostrum production of Stage I lactogenesis ends and transitional milk begins. In this phase the volume of milk produced increases. There are a total of three stages of lactogenesis, all of which are influenced by hormones. The hormone prolactin increases after delivery and increases further after the infant starts suckling at the mother’s breast. Breast milk synthesis increases as prolactin levels rise. If a mother and infant are separated after a CD, suckling is postponed, leading to a postponed increase in breast milk supply. Another hormone, oxytocin, is also affected by a suckling infant. Suckling stimulates the release of oxytocin, which initiates the milk ejection reflex, causing a release of milk from the breast. Initiating breastfeeding shortly after delivery and nursing frequently are important factors in establishing a breast milk supply.

Another barrier to successful breastfeeding is when additional medical interventions are needed during and right after delivery. The more medical interventions used during labor, the greater chances for these interventions to interfere with getting breastfeeding off to a good start. The increase in needed medical interventions tends to result from an overuse of EA and depressants of the central nervous system.\textsuperscript{10} The American Academy of Pediatrics\textsuperscript{13} recommends that any non-emergency medical procedures that need to be done should be
postponed for at least the first hour post-partum and after the first successful breastfeeding session.

According to Riordan, when unexpected interventions occur at birth, a mother’s commitment to breastfeeding and her self-confidence plays a part in breastfeeding success. If her need for a CD has lowered her confidence in her body to function the way it needs to, this may affect her confidence in breastfeeding her infant. After a CD the mother also has to deal with the added pain, stress, and recovery time that comes with a surgical procedure. It is helpful for the mother to be alert when starting to breastfeed her baby. If she is still under the effects of anesthesia, she may need to postpone the initiation of breastfeeding. The mother needs to find a comfortable breastfeeding position for her and her infant, trying to avoid putting pressure on the incision site. By day two or three postpartum, mothers can usually breastfeed comfortably in the side-lying position. The infant may also be sleepier if he/she was exposed to a lot of anesthesia or pain medication during labor.

An infant’s experience during a CD may also impact breastfeeding success. Kroeger stated that breastfeeding issues have been seen in more infants born via CD. She explained that the way in which the baby is lifted out of the uterus applies extra pressure at cranial base of the infant’s skull. This could impact the nerves and blood vessels in this area. In addition to this, infants born via CD also tend to need more suctioning, which could end up affecting oral motor function. In considering the issues of medical interventions, anesthesia and analgesics, separation of mother and infant, postponing of breastfeeding initiation, maternal post-operative pain, the impact of a CD on the infant, being a first-time parent, and having a lack of breastfeeding support from friends and family, these barriers can add up to mothers having difficulty in getting breastfeeding off to a good start.
Chapter 2: Review of Literature

In the professional literature on breastfeeding rates after a CD, a study done by Perez-Rios and colleagues\textsuperscript{15} in Puerto Rico looked at 1,695 women who delivered a singleton pregnancy via CD between 1990 and 1996. They found that 66.4\% of women who delivered vaginally initiated breastfeeding, while 61.5\% of women who had a CD initiated breastfeeding (p $< 0.05$). This study used data that was approximately 20 years old and states that breastfeeding rates in Puerto Rico have increased since then. This study indicated that having a CD did create a barrier to breastfeeding. However, due to the data being 20 years old, it is possible that medical procedures may be different due to advancements in technology. Overall, the authors recommended that mothers receive more breastfeeding support after a CD and also encouraged increased adoption of the Baby-Friendly Hospital Initiative (BFHI) by hospitals.

The BFHI was developed in the 1980s by the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF).\textsuperscript{16} The purpose of this initiative was to promote breastfeeding in hospitals around the world, and various studies have proven this initiative’s cost-effectiveness. It includes ten steps that hospitals need to meet in order to be considered “baby-friendly”: prenatal breastfeeding education and promotion, breastfeeding initiation within thirty minutes of delivery, newborns only getting breast milk, newborns not receiving any bottles or pacifiers, mother and infant “rooming in” together, infants breastfeeding on demand, hospital policies promoting breastfeeding, breastfeeding training for all hospital staff, breastfeeding counseling for postpartum women, and community-based breastfeeding support for postpartum women. Chien and colleagues\textsuperscript{17} found there was a positive correlation between promotion of the ten steps of the BFHI in Taiwanese hospitals, the likelihood of women breastfeeding at the hospital, and continued breastfeeding at one month after delivery. There was still a slight
positive correlation for experiencing the ten steps of BFHI and breastfeeding at three months after delivery.

Chalmers and colleagues\textsuperscript{18} used data collected from the May 2006 Canadian Census. Responses from 6,421 women were included in this study. They found that women who underwent CDs (n=1689), especially unplanned CDs (n=822), experienced more interventions during delivery and less mother-infant interaction after birth. The time frame in between delivery and the first mother-infant contact was longer, and mother and infant had less skin-to-skin time. Breastfeeding initiation rates were similar between women who delivered via CD versus vaginally (n=4732); however, women who delivered via CD breastfed less often.

Instances of an increase in pacifier use, postponed initiation of breastfeeding, use of more scheduled feedings and less feeding on demand, and free AIM given were seen with women who delivered via CD. The authors indicated that due to the common use of regional epidural anesthesia versus general anesthesia (which is rarely used) during CDs in Canada, there should have been more opportunity for mother-infant contact, skin-to-skin, and times for breastfeeding sessions. The authors concluded by encouraging the use of the ten steps of BFHI and recommending that practitioners try to provide the same after-delivery experience for women that delivered via CD as those women who delivered vaginally (i.e., mother-infant contact shortly after birth, time for skin-to-skin, and sufficient breastfeeding support).

In 2006 Cakmak and Kuguoglu\textsuperscript{19} published a study done at a private hospital in Istanbul, Turkey. Represented in the study were 118 women who had CDs and 82 women who delivered vaginally. Breastfeeding outcomes were measured by the LATCH Breastfeeding Charting System, a charting system that uses the acronym LATCH to assess how breastfeeding is going and assigns a score to each area of assessment; the higher the score, the more positive the
breastfeeding outcome (see definition of terms for a further explanation of this system). Statistically significant differences were noted between the two groups of women. The researchers in this study looked at the first and third breastfeeding sessions and found that the average scores for women who had a CD were 6.27 and 8.81. The average scores for women who delivered vaginally were 7.46 and 9.70. In both groups the more breastfeeding sessions that mother and infant had, the less need for breastfeeding support. The authors concluded that method of delivery does affect breastfeeding and that women who have undergone a CD, especially women who had general anesthesia, require additional breastfeeding support, specifically in positioning their babies to breastfeed. Women who are motivated and experienced with breastfeeding and are having a repeat scheduled CD had less difficulty in breastfeeding their infants. The authors recommended that the cross-cradle and side-lying breastfeeding positions be used after a CD.

Evans and colleagues\textsuperscript{10} published a study that was done at a metropolitan hospital in South Australia between 1998 and 1999. They looked at breast milk transfer over the first week of life in 88 breastfeeding mothers who had a vaginal delivery and 97 breastfeeding mothers who delivered via CD. On the second and fifth days after delivery there was a significantly lower volume of breast milk transferred to infants born via CD versus infants born vaginally (p < 0.05). However, by day six there was no difference in breast milk transfer between the two groups (p = 0.08). Within the CD group, women who had an emergency CD had significantly higher mean breast milk transfer on day two and four than women who had a planned CD. They noted that there was an unneeded delay in breastfeeding initiation for the CD group. Overall, the amount of breast milk transfer was not affected long-term by method of delivery.
A 2011 study published by Hsien and colleagues in the journal *Asian Nursing Research* explored breast symptoms in women who had CDs in several Taiwanese hospitals. While it is known that breastfeeding as soon as possible after birth is recommended, this study found that mothers who started suckling their infants while still on the operating table had more breast symptoms such as engorgement and breast hardening as well as feeling more stress. This study recommended that mothers who have CDs should initiate breastfeeding within 30 to 60 minutes after birth, once the mother has had closure of her CD wound and is in a more comfortable and private situation. This recommendation is noted in the ten steps of the BFHI. The authors of this study also found that EA can result in tachycardia and hypotension. Other drugs used during this procedure, such as 2% Xylocaine, can be related to tremor, dizziness, respiratory issues, and interference with the mother’s consciousness. The mother’s discomfort from the cumulative effect of the CD procedure can lead to additional stress for the mother and an inhibition of breast milk production, as stress in a woman’s body can work against breast milk production. The authors also emphasized the important role that the nursing staff plays during this time. They recommended that nurses provide the mothers with education on maintenance of breast milk production and infant care and remind the mother’s family and/or support persons to encourage the mother in her breastfeeding efforts. This support can lead to a reduction of postpartum stress for the mother and increase her confidence in her breastfeeding abilities. Breastfeeding rates in Taiwan have increased in recent years due to the implementation of BFHI.

Nickerson and colleagues emphasized that breastfeeding support is essential after a CD. They interviewed 19 women from a northeastern metropolitan city in the United States who had recent experience with breastfeeding. Some of these women delivered via CD (the article did not say how many of these women went through surgical delivery) and stated that their surgical
delivery was unexpected. Some of the women who went through a CD commented that they did not feel completely “with it” due to the anesthesia and medications, and their need for support increased.

Carlander and colleagues\textsuperscript{22} looked at contact between mother and infant and attitudes towards breastfeeding in relation to method of delivery at a hospital in Stockholm, Sweden. The sample size was 510 primipara women. Out of this number, 198 women had a spontaneous vaginal delivery, 35 women had an assisted vaginal delivery (forceps or vacuum extraction), 96 women had a planned CD via request, 116 women had a planned CD via medical indication, and 65 women had an emergency CD. The authors found that all of the participants found breastfeeding to be the most stressful on the second day postpartum; however, the breastfeeding experience was more stressful for the CD group overall. The authors suggest that this may be due to the women’s pain from their CDs. Women who had requested a planned CD had more breastfeeding problems and were doing less breastfeeding at three and nine months post-partum. The women who delivered via CD were also found to have more sadness on the second day post-partum. This study brings attention to the importance of looking at the overall health of the mother by including her emotional health needs in relation to breastfeeding success.

Physical pain can play a part in how women function after a CD. Woods and colleagues\textsuperscript{23} reported that successful breastfeeding within the first day of birth for 621 women in a northeast U.S. hospital correlated with women who had lower maternal pain scores after a CD and had initiated breastfeeding within two hours of birth. This study was done via retrospective electronic chart review, and it found that women with patient-controlled epidural analgesia had less moderate to severe pain 24 hours after their CD versus women who had only patient-controlled analgesia (14\% vs. 28.6\%). They noted that the higher the pain scores, the lower the
frequency of breastfeeding, specifically less than six times per day. Woods and colleagues did not find any statistical significance in timing of breastfeeding initiation and modality of pain management. This study highlighted the breastfeeding barrier of pain after a CD and demonstrates that pain management can play a part in breastfeeding success.

Grassley and colleagues\textsuperscript{24} performed a retrospective chart review of 302 charts between 2007 and 2009 from a metropolitan hospital within the U.S. Fifty-one percent of infants born via CD (n=67) received AIM supplementation during their time at the hospital, while 31\% of infants born vaginally (n=234) received AIM supplementation (p=0.014). The average age of breastfeeding initiation for infants born via CD was 3.03 hours, versus the average breastfeeding initiation age of 1.7 hours for infants born vaginally. The study found that newborns that were older at their first breastfeeding (3.03 hours versus 1.7 hours) were more likely to receive AIM supplementation (p=0.048). During the first 24 hours after birth, the infants that did not receive AIM supplementation were found to breastfeed more frequently (8.65 vs. 6.60 times, p < 0.001) and have longer breastfeeding sessions (159 vs.106 minutes, p < 0.001) in comparison with infants who did receive supplementation. In this study, infants who were born via CD tended to have breastfeeding initiated at later times, breastfed less frequently, and had shorter breastfeeding sessions than infants born vaginally.

In addressing the effects that EA may have on breastfeeding rates and success, there is limited information within professional literature. Dozier and colleagues\textsuperscript{25} conducted a study involving 772 breastfeeding women from New York. They found that EA strongly correlated with breastfeeding cessation (hazard ratio 1.26 [95 \% confidence interval 1.10, 1.44], p < 0.01). Regardless of whether or not the hospital was Baby-Friendly (BFHI), mothers were more likely to stop breastfeeding within the first month post-partum if they had received EA during delivery.
Independent risk factors for these women that were shown to have a significant correlation with cessation of breastfeeding included lower income, less maternal education, lower maternal age, less breastfeeding confidence, and no timed breastfeeding goal. Despite the correlation between EA and breastfeeding cessation, the independent risk factors may have played a role in poor breastfeeding outcomes.

Wiklund and colleagues\textsuperscript{26} carried out a retrospective comparative study that looked at 702 healthy women and babies, 351 of which received EA during labor and 351 that did not receive EA during labor. The study was done between January and April of 2000 in Stockholm, Sweden and the babies whose mothers used EA during labor were less likely to suckle at the breast within the first four hours of delivery, were more likely to receive AIM while at the hospital, and were less likely to be fully breastfed at hospital discharge. The authors suggest that possible barriers to breastfeeding success presented by EA administration could be overcome with adequate breastfeeding support. They also suggest that more studies looking at EA effects on short-term and long-term breastfeeding outcomes would be beneficial.

A review of research literature in respect to breastfeeding rates and support needs after a CD or EA administration did not reveal many studies done in the United States. Research specifics on breastfeeding difficulties and support needs that women have after a CD or EA is limited as well, thereby indicating that this topic needs further exploration. If having a CD or EA is indeed a barrier to successful breastfeeding, specific interventions need to be developed for these women to provide the specialized breastfeeding support that they need.
Chapter 3: Research Questions and Methodology

This study answers the following question: Do women who have had a Cesarean delivery (CD) or epidural anesthesia (EA) report a lower prevalence of breastfeeding initiation and length of breastfeeding duration than women who deliver vaginally and without EA?

Subproblem 1: Are there more barriers to breastfeeding depending on whether a Cesarean delivery was planned or an emergency procedure?

Subproblem 2: What specific barriers to breastfeeding do women have when they go through a Cesarean delivery or epidural anesthesia?

Subproblem 3: What specific breastfeeding support needs do mothers have after going through a Cesarean delivery or epidural anesthesia?

Hypothesis: Women who have cesarean deliveries or epidural anesthesia have a low prevalence of breastfeeding initiation and duration due to increased barriers to breastfeeding success. They need specific and individualized interventions to address these barriers. They will have shorter duration rates of breastfeeding due to limited breastfeeding in the first two weeks after delivery.

Methodology

This was a qualitative study utilizing interviews to collect data and information from participants to better understand breastfeeding needs of women after a CD or EA. A letter of permission was obtained from the Lamaze Family Center of Ann Arbor to recruit participants through their facility. Approval for this research was also obtained from the Eastern Michigan University Human Subjects Review Committee (see Appendix A). A set of 15 to 25 women were recruited for this study by having them directly contact the primary researcher via e-mail in
response to a mass e-mail sent out by the Lamaze Family Center of Ann Arbor to members of their e-mail list. Each woman was recruited with the same introduction and invitation to participate in this study (see Appendix B). Women were screened for their eligibility to participate. If eligibility criteria were met, the interview was scheduled. The eligibility criteria included women who were 18 years of age or older with no medical issues, had given birth via CD or had EA between June 2013 and April 2015, had either breastfed or who prenatally were planning to breastfeed, were at least two weeks post-partum, had a singleton pregnancy, had an infant who was born at term and was not low birthweight, and had an infant who did not have medical conditions.

The medical issues that excluded women from participating in this study included breast reduction/augmentation surgeries, physical limitations of mother and infant that would interfere with facilitation of breastfeeding, and any condition that mother or infant would have that would require treatments or medications that interfere with opportunities to breastfeed. Any possible interference by medical issues was specific to the early postpartum period. Medical conditions specific to the infant that would have excluded them from participation included developmental syndromes or delay, neural tube defects, cleft lip or palate, and gastrointestinal abnormalities.

The eligible women were assigned a number for identification in order to maintain confidentiality. The primary researcher personally conducted all interviews, and the interviews were held during the months of March and April of 2015. The individual participant interviews were scheduled at the participant’s place of choice, and every effort was made by the researcher to secure as private a location as possible. Interview locations included an office at the local Health Department building, public libraries, a café dining area, and personal residences. Before the interviews started, the informed consent form (see Appendix C) was explained to each
participant, and the participant was offered time to review it and sign it in order to be part of this research study. Two informed consent forms were signed by the primary researcher and the participant, in order to provide both parties with a signed copy. The participants had the opportunity to decline consent throughout the interview, as well as request omission of any part of the interview that they did not wish to be part of the research data. They were offered the option to end the interview at any time if they no longer wished to participate. None of the participants declined consent, requested omission of data, or opted to end the interview early.

The interviews were audio recorded to allow the researcher to review the interviews as needed for accurate data collection. The participants had the option of declining the audio recording by signing the audio recording declination line at the end of the informed consent form. None of the participants declined the audio recording.

Other persons were not allowed to be present in the room unless the participant gave the authorization for these persons to be present. The participant indicated this authorization by signing permission for additional persons at the bottom of the informed consent form. If a private room was not available and the participant agreed to meet in a public area, such as the general area of a public library or café dining area, the participant gave authorization to conduct the interview in a public area by signing at the end of the consent form. In these instances, the researcher sought to provide as private of a location as possible to conduct the interview.

A 10-question questionnaire (see Appendix D) was used to interview the participant, the participant responses were recorded directly on this form, and each participant was asked all 10 questions. The primary researcher verbally presented the 10 questions to all of the participants. The questionnaire consisted of questions regarding the mother’s age, her education level, race/ethnicity, whether she has any other children, any past breastfeeding experiences, the most
recent/current breastfeeding duration, and what type of CD she had. The questionnaire addressed the participants’ prenatal breastfeeding education, type of CD or EA, their confidence level regarding breastfeeding before and after delivery, their breastfeeding experience, breastfeeding support that they received, what other support they would have benefited from, and if artificial infant milk (AIM) was introduced during the first two weeks post-partum. The participants were given a gift of appreciation for participating in the interview, which was a $10.00 gift card to an infant/toddler store in the area, The Little Seedling.

Data analysis was done by grouping participant answers gathered from the 10 interview questions into common themes, compiling into tables and figures, and comparing answers between the three identified groups of participants: planned CDs, emergency CDs, and EA. The more popular themes or answers given for the questions were used to identify breastfeeding education and support needs that were representative of women undergoing these procedures.
Chapter 4: Results and Discussion of Data

Results

Sixteen women who responded to the recruitment e-mail sent out by the Lamaze Family Center in Ann Arbor, Michigan participated in this study. These 16 women had similar demographics. All 16 women had given birth to only one child so far in their lifetime. Ninety-four percent (n=15) of the women identified as Caucasian, and 6% (n=1) identified as Hispanic. The participants’ ages ranged from 27 to 41 (see Figure 1). Education levels ranged from a bachelor’s degree to a doctoral degree (PhD) (see Figure 2). Infants were born between 37 and 42 weeks gestation (see Figure 3), and birthweights ranged from 6 lb. 13oz. to 10 lb. 2oz. (see Figure 4). At the time of the interviews, the participants’ children’s ages ranged from 11 months to 22 months.

Figure 1: Age of participants in breastfeeding study (n=16)
Figure 2: Education level of participants in breastfeeding study (n=16)

Figure 3: Gestational age of infants at birth (n=16)
Eleven participants had a CD, with 36% (n=4) of these CDs being planned and 64% (n=7) of the CDs being emergency. Thirty-one percent (n=5) of the total participants had a vaginal delivery assisted by administration of epidural anesthesia (see Figure 5).
All 16 women breastfed their children, and seven of the participants were still breastfeeding their children at the time of the interview (see Table 1).

Table 1: Breastfeeding duration of participants (n=16)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Duration of breastfeeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 weeks</td>
</tr>
<tr>
<td>1</td>
<td>6 months</td>
</tr>
<tr>
<td>1</td>
<td>7 months</td>
</tr>
<tr>
<td>1</td>
<td>Still breastfeeding at 11.5 months</td>
</tr>
<tr>
<td>1</td>
<td>12 months (exclusive pumping after 3 months)</td>
</tr>
<tr>
<td>1</td>
<td>12.5 months</td>
</tr>
<tr>
<td>2</td>
<td>Still breastfeeding at 13 months</td>
</tr>
<tr>
<td>1</td>
<td>Still breastfeeding at 14 months</td>
</tr>
<tr>
<td>1</td>
<td>Still breastfeeding at 14.5 months</td>
</tr>
<tr>
<td>2</td>
<td>15 months</td>
</tr>
<tr>
<td>1</td>
<td>15.5 months</td>
</tr>
<tr>
<td>1</td>
<td>16 months</td>
</tr>
<tr>
<td>1</td>
<td>Still breastfeeding at 19 months</td>
</tr>
<tr>
<td>1</td>
<td>Still breastfeeding at 22 months</td>
</tr>
</tbody>
</table>
Breastfeeding duration rates ranged from two weeks postpartum to still breastfeeding at 22 months of age. Eighty-one percent (n=13) of the participants breastfed their child for at least 11.5 months. The participants who breastfed for less than 11.5 months (n=3) all had emergency CDs. Of these three participants, one found that her breast milk supply decreased after returning to work when her infant was several months old. Another participant never developed a large milk supply and feels this may have been connected to severe blood loss during delivery. A third participant also had severe blood loss during delivery, and the pediatrician had concerns that her infant was not gaining sufficient weight at the first pediatric appointment. With this concern, AIM supplementation was begun, bottles were introduced, and subsequently the infant stopped breastfeeding.

Each participant was interviewed using a 10-question questionnaire. The first interview question that was asked of the participants was, “Did you have any prenatal breastfeeding education?” Prenatal breastfeeding classes were attended by 69% of the participants (n=11). Forty-four percent (n=7) of participants said that they attended a childbirth class which touched on breastfeeding. Twenty-five percent (n=4) of participants took both a prenatal breastfeeding class and a childbirth class. Thirteen percent (n=2) of participants took neither a breastfeeding or childbirth class. Other methods of breastfeeding education that were accessed included reading books (n=7), doing on-line searches for breastfeeding information (n=7), talking with family and friends that had breastfeeding experience (n=10), and consulting with a Lactation Consultant prenatally (n=1) (see Figure 6).
The second interview question was, “On a scale of one to five (one being no confidence and five being very confident) how confident were you in breastfeeding your baby before you delivered?” The prenatal breastfeeding confidence levels were based on a sample size of 15, as one participant did not specify a confidence level number. Prior to delivery 80% (n=12) of the participants had a confidence level of three and a half or higher that they would be able to breastfeed their infant (see Figure 7). Participants’ reasons for higher prenatal confidence levels included support available from their family and work environment, being a first pregnancy without any other experience to compare to, not thinking of the possibility of a CD, not aware or considering any of the breastfeeding challenges that could arise after delivery, and feeling that breastfeeding difficulties were due largely to a lack of perseverance and commitment. Participants reported having the desire and determination to make breastfeeding work, feeling strongly about the importance of breastfeeding their infant, being raised in a home where breastfeeding was successful and was the norm, not worrying about any possible breastfeeding issues, and going into it with confidence.
Twenty percent (n=3) of participants reported a prenatal breastfeeding confidence level below three and a half. Reasons for lower prenatal breastfeeding confidence levels included having some concerns regarding how breastfeeding would go, knowing that there could be some difficulties, having some anxiety around unknowns such as latching and breast milk coming in, being unsure of the ability to breastfeed, reading materials that indicated breastfeeding needs to be learned and doesn’t necessarily come naturally, having a lack of experience, and feeling isolated.

Figure 7: Prenatal breastfeeding confidence level (1= no confidence, 5= very confident)(n=15)

The third interview question was, “On a scale of one to five how confident were you in breastfeeding your baby after delivery?” Looking at the early postpartum period, the breastfeeding confidence levels of three and a half or above decreased to 38% (n=6) of participants (out of a sample size of 16 participants) (see Figure 8). Reasons that participants gave for reporting lower confidence levels included a decrease in confidence after realizing how hard breastfeeding could be, breast milk supply not coming in right away, difficulty and pain
with latching infant onto the breast, lack of support from hospital staff, maternal sleep deprivation, infant wanting to nurse frequently at every one to two hours, difficulty figuring out how to use the breast pump, the participant being told to pump in between feedings which was very time-consuming, that both mother and infant needed to learn how to breastfeed, uncertainty as to whether she was doing it properly, heightened anxiety due to being a new mom and going through a long labor followed by an emergency CD, and a lack of support at home that she did have at the hospital. Several participants discussed self-doubt in breastfeeding as they were experiencing pain and had been told that experiencing pain means something is not going right. One participant reported her infant was latching well and that she had a higher level of confidence in breastfeeding until she found out at the first pediatric appointment that her infant had lost a lot of weight.

Figure 8: Post-delivery breastfeeding confidence level (1= no confidence, 5= very confident)(n=16)
Reasons for higher confidence levels for the participants in the early postpartum period included knowing it would be difficult and that they would get through it, belief in their ability to breastfeed even with initial difficulties, and having breastfeeding support at the hospital such as the hospital nurse spending a lot of time helping with latching and teaching breastfeeding positions specific for women who had experienced a CD.

In looking at post-delivery confidence levels of participants whose confidence levels were at three and a half and above (n=6), one-third of participants (n=2) had planned CDs, one-third of participants (n=2) had an emergency CD, and one-third of participants (n=2) had EA.

The fourth interview question was, “Do you think your type of CD (emergency versus planned) made it any easier or harder to breastfeed your baby?” Eleven participants had a CD (see Figure 9). Sixty-four percent (n = 7) of the CDs were emergency while 36% (n = 4) were planned. Three out of the four women who had a planned CD felt that having a planned CD versus an emergency CD made breastfeeding easier, as they were able to plan for the procedure and had more of an idea of what to expect postpartum. Participant responses included the ability to make a plan and develop personal goals for delivery and the early postpartum period, having time to physically and mentally prepare, having the ability to get a good night sleep before delivery, and that the delivery process was shorter and expended less energy. Another comment was that an emergency CD would have made the process surrounding delivery more hectic. A third participant felt that having the knowledge that she would be having a CD helped her to mentally prepare by trying to be positive, to focus on breastfeeding, and to recover from the CD. The participant that did not feel that a planned CD made breastfeeding easier referred to the CD process in general as complicating breastfeeding. Having a CD made physical recovery more difficult after having a baby. During the first 24 hours, it was physically difficult and
uncomfortable for her to hold her infant, and she needed assistance with holding and breastfeeding her infant.

![Figure 9: Effect of a planned Cesarean delivery on breastfeeding (n=4)](image)

Out of the seven participants who had an emergency CD, 29% (n=2) were unsure whether this type of CD made breastfeeding more difficult. One participant felt that having an emergency CD made breastfeeding more difficult, as the emotional and mental surprise of the need for a CD took a toll, as well as feeling anxious and overly tired. However, she also felt that since her body already started the labor process, her breast milk coming in within two days after delivery aided her breastfeeding experience. Four participants (57%) discussed that it was the cesarean procedure overall and the complications that arose that made breastfeeding more difficult, and not necessarily the fact that it was an emergency CD (see Figure 10).

The participants who felt that difficulties arose from having a CD in general cited several reasons for this, including severe blood loss during the surgery, not tolerating the procedure well, multiple medical interventions during the delivery, pain killers affecting maternal mobility and functionality after delivery, difficulty holding and positioning their infant due to the incision site,
not anticipating the need for more help after delivery, and trying to heal her own body plus take
care of her infant.

Figure 10: Effect of emergency Cesarean delivery on breastfeeding (n=7)

The fifth interview question was, “Do you think EA made it more difficult to breastfeed
your baby?” Five of the participants had a vaginal delivery assisted by EA. All of these
participants (n=5) did not think that EA administration led to any breastfeeding barriers and had
not attributed its use to any breastfeeding problems they had (see Figure 11). Participant
comments included that infant was alert and not sleepy, and that the infant latched right away.
One participant mentioned that since this was her first child, she did not have any other neonatal
experiences to compare with this breastfeeding experience.
Difficulties or Stressors

The sixth interview question that participants were asked was, “What difficulties or stressors did you face in getting breastfeeding off to a good start?” The categorized responses of the four women who had a planned CD are located in Figure 12. The responses included concerns regarding breast milk supply, infant losing too much weight in the early postpartum period, needing more breastfeeding guidance, receiving conflicting breastfeeding advice from hospital staff, need for maternal physical recovery, difficulty latching, no immediate skin-to-skin contact between mother and infant, nipple pain, and engorgement. Three participants identified concerns regarding feeling uncertain about their breast milk supply, as one participant’s infant was very hungry and her breast milk did not come in until five days postpartum. This led to frequent nursing which in turn also led to nipple soreness. Another participant was concerned during the first several days as to whether her infant was getting enough and states that her milk did not come in until the fifth day postpartum.
Two of the participants were told that their infants lost too much weight. One participant whose baby was sleepier and whose breast milk supply did not come in until day four or five received the information about her infant’s weight loss at the first pediatric appointment during the first week postpartum and was instructed to start supplementing with AIM. This mother also identified difficulty latching as a stressor. The second participant was told in the hospital that at two days of age, her infant had lost too much weight due to ineffective breast milk transfer at the breast, so the lactation consultant recommended using a SNS with AIM.

The two respondents who needed more breastfeeding guidance included one who needed more education on using the Supplemental Nurser System (SNS), which was needed while the participant was still in the hospital, and one who needed more direction on improving nursing from the obstetrician after leaving the hospital. One participant discussed the need for more continuity with breastfeeding support and guidance in the hospital. She had received conflicting advice and opinions from various lactation consultants and nurses in the hospital, which lead to frustration and feeling overwhelmed.
Difficulties surrounding maternal physical recovery were related to the physical pain of the incision site and the emotional/hormonal recovery associated with postpartum depression. One participant identified not being able to do skin-to-skin right away, which was part of her birth plan, due to the CD. One participant reported having a lot of engorgement.

Seven participants had an emergency CD and their responses to the breastfeeding difficulties and stressors that they experienced fell within 10 main categories (see Figure 13). These categories included nipple soreness and pain, first-time mother uncertainty, latching difficulty, positioning difficulties, breast milk supply concerns, length of nursing sessions, conflicting breastfeeding advice, frequency of nursing sessions, infant losing too much weight in the early postpartum period, maternal sleep deprivation, no family support, and engorgement.
Nipple soreness and pain were related to incorrect latching, engorgement, thrush infection on the nipple area and frequent pumping with the wrong sized pump phalange. First-time mother uncertainty included fear of failure as a mother, unsure of what she was doing and figuring out how to breastfeed, limited understanding of what was happening, when to nurse infant, when to switch sides, and the understanding of let-down of breast milk. Four women cited latching difficulty as an issue. Positioning difficulties were related to pain at the incision site, needing to learn different positions, and difficulty for the mother being able to get comfortable while nursing.

Uncertainty regarding breast milk supply was a concern specifically for the two participants that needed a blood transfusion after delivery, and these women felt that their blood loss may have impacted their breast milk supply. One participant never developed a large breast milk supply throughout the entire breastfeeding experience, and the other participant felt that her full breast milk supply did not come in until one to two weeks postpartum.

Two participants cited lack of breastfeeding support. One participant who was having concerns about latching issues, breast milk supply, and infant weight gain stated that it took her a week to get an appointment at the breastfeeding clinic at the pediatrician’s office. Another participant had a lack of family, support which made breastfeeding more difficult and stressful. At the same time, she was also feeling pressured by a peer to breastfeed, which also caused some stress.
Figure 13: Difficulties and stressors for women with an emergency Cesarean delivery (n=7)

Two participants felt that the length of time that the infant nursed at a feeding was a stressor, and one participant felt that the frequency at which the infant wanted to nurse was a stressor. One participant felt that she received conflicting breastfeeding advice, stating that while at the breastfeeding class she was told that she did not have to support her infant’s head when nursing, while at the hospital after delivery she was told to push her infant’s head onto her breast. Under the category of the infant losing too much weight, this infant had lost too much weight at the first pediatric appointment and the pediatrician recommended starting AIM. This mother was having severe nipple pain before this and was still waiting for her breast milk supply to come in, which came in on the fifth day postpartum. One participant felt that sleep deprivation was a stressor when it came to breastfeeding.

Five of the participants had a vaginal birth assisted by EA. Seven main categories of difficulties or stressor areas were identified by these women in regards to getting breastfeeding
off to a good start (see Figure 14). These categories included maternal exhaustion, frequency of nursing sessions, lack of breastfeeding support, difficulty with latching, nipple pain, relatives being disruptive when infant needed to be nursed, maternal physical recovery, and being a first-time mother. Four participants cited maternal exhaustion as a stressor. One woman who was in labor for almost 30 hours and didn’t sleep the entire time, or the night before she went to the hospital, felt physically and mentally exhausted. Another woman discussed not getting sleep for the first two weeks postpartum. One woman reported exhaustion due to the constant demand of nursing and cluster feeding.

Frequency of nursing during the early postpartum period was also reported as a stressor by three of the women, coupled with already feeling drained and exhausted. Lack of support cited by two women included limited lactation consultant contact; as one woman stated the lactation consultant at the hospital came in for five minutes and then told her to call when her breast milk came in. Another participant felt that the nurses at the hospital where she delivered did not offer much breastfeeding support and were quick to suggest using AIM if it looked like breastfeeding was not working out.

Three women identified latching issues, including a shallow latch, which led to mastitis several weeks postpartum and latching issues which led to nipple pain and bleeding. Two participants also felt that well-meaning relatives were disruptive to getting breastfeeding off to a good start, as they wanted to hold the baby often, whether in the hospital or after mother and infant arrived home. Another woman felt that trying to heal and recover from delivery made life more challenging for the first two weeks postpartum. One participant cited being a first-time mother as a breastfeeding difficulty and stressor.
Breastfeeding Support

The seventh interview question was, “What type of breastfeeding support did you receive and from whom?” The four women who had a planned CD identified seven main categories for sources of breastfeeding support (see Figure 15); the lactation consultant in the hospital, the home visiting nurse from the hospital, family members, online activity, La Leche League, a lactation consultant outside of the hospital, and the nurse in the hospital. The lactation consultant at the hospital was identified as a breastfeeding support person for three of the participants. In these instances, the identified support that the lactation consultant provided included helping the mother to hand express and feed the infant in the hospital, letting the mother know what is normal for the process of breastfeeding during the early postpartum period, helping the mother try different breastfeeding positions to help achieve an efficient latch, and visiting daily while in the hospital to make sure that breastfeeding was going well. The fourth participant felt that the lactation consultant at the hospital was not overly helpful, as the lactation consultant...
did not specifically watch and evaluate a breastfeeding session. The mother was then instructed by the lactation consultant to use a SNS. This mother was sleepy and ended up missing a lot of the details on how to use the SNS.

The home visiting nurse from the hospital, who provides an early postpartum home visit once the mother and her infant go home after delivery, was also identified as a source of breastfeeding support. Participant responses include receiving helpful advice on breast massage and pumping, pointers on increasing breast milk supply, and reassurance that breastfeeding is going well and AIM is not needed. One mother stated that the home visiting nurse did not give much breastfeeding support due to the complexity of the mother’s breastfeeding concerns, but did provide encouragement to continue breastfeeding.

Another source of breastfeeding support that was identified included family support. Having family members who were supportive of breastfeeding was very helpful. One of the participants identified her husband as being very supportive of her breastfeeding their infant, and another participant’s sister who had prior breastfeeding experience was very supportive and was a good breastfeeding resource.

Other sources of breastfeeding support that were reported but not as consistently by all participants included online searches, La Leche League, a lactation consultant outside of the hospital, and the nurse at the hospital. One participant reported that she received breastfeeding support online by communicating with others on Facebook. One participant contacted La Leche League and a lactation consultant to ask breastfeeding questions as they arose. Another participant reported that the nurse at the hospital was helpful by visiting her room often to address breastfeeding issues.
Figure 15: Breastfeeding support received by women with a planned Cesarean delivery (n=4)

The seven women who had an emergency CD identified 11 sources of breastfeeding support (see Figure 16). These sources included the lactation consultant at the hospital, the nurse at the hospital, family members, lactation consultant at the pediatrician’s office, online searches, the home visiting nurse from the hospital, a new mothers support group, friends, the breastfeeding clinic at the hospital, the hospital lactation support line, and La Leche League.

Participants reported that the lactation consultants and nurses at the hospital gave them breastfeeding information, tips, and resources. They helped with nipple issues, latching assistance, information on hand expression, and helped to increase the mother’s confidence in breastfeeding. Participants cited family members as being supportive, providing encouragement, and being a breastfeeding cheerleader. The lactation consultants at the pediatrician’s office
helped by discussing breastfeeding techniques, positioning, latching, providing encouragement, and evaluating infants’ breast milk transfer after a feeding.

Online searches included Googling breastfeeding questions and concerns and going to trusted breastfeeding websites. Home visiting nurses helped with latching, explained how supply and demand applies to breast milk supply, and discussed how the woman’s husband could help with breastfeeding. Two of the participants attended a new mothers group, which they found very helpful hearing the struggles that other mothers were facing and discussing strategies to handling the struggles. One woman felt that it was beneficial for her to be able to share her breastfeeding story with other mothers, and participating in this group also lead to increasing her comfort level in breastfeeding in public. Friends were reported as a source of breastfeeding support by being able to draw from their own breastfeeding experience to give breastfeeding advice and being someone to converse with regarding the participants’ breastfeeding concerns.

The breastfeeding clinic at the hospital gave a participant breastfeeding strategies, explained techniques for sitting and supporting the infant and herself during breastfeeding after a CD, evaluated the infant’s breast milk transfer after a feeding, addressed latching issues, and gave nipple creams to treat nipple soreness/pain. Another participant contacted the lactation support line through the hospital as well as La Leche League with her breastfeeding concerns.
The five participants who received EA during delivery identified nine sources of breastfeeding support (see Figure 17). These sources included family members, the lactation consultant at the hospital, a breastfeeding support group, online searches, a private practice lactation consultant, the lactation consultant at the pediatrician’s office, the home visiting nurse from the hospital, friends, and the nurse at the hospital. Family members gave general support and reassurance, and female family members shared their breastfeeding experiences related to breastfeeding issues. The lactation consultant at the hospital assessed the infant’s latch, helped to give the mother confidence in herself and let her know that she was doing things correctly, gave breastfeeding tips, and gave reassurance that the infant was getting enough breast milk at feedings. Two participants cited the breastfeeding support groups: one of these groups being online and the other group meeting in person. These groups helped to provide breastfeeding support by offering opportunities for the women to talk with other breastfeeding mothers who
had the same questions and were experiencing the same issues. Online searches were used to look at information regarding maternal nutrition during breastfeeding, medication use during breastfeeding, and latching issues.

A private practice lactation consultant was contacted by one of the participants and addressed latching concerns. The lactation consultant at the pediatrician’s office evaluated the infant’s breast milk transfer after a feeding, provided reassurance to the mother, and gave tips on latching and positioning. The home visiting nurse from the hospital helped with breastfeeding and answered breastfeeding questions. One participant received breastfeeding support by speaking with friends who were breastfeeding mothers. The nurses at the hospital were reported to help one mother with SNS use.

![Breastfeeding Support Received by Women with Epidural Anesthesia (n=5)](chart.png)

Figure 17: Breastfeeding support received by women with epidural anesthesia (n=5)

Table 2 combines the responses of all participants (n=16), identifying breastfeeding support sources with a response rate of at least four participants for the lactation consultant in the hospital.
hospital, family members, the nurse in the hospital, a lactation consultant outside of the hospital, online activity, and attending a new mother’s support group.

Table 2: Summary of breastfeeding support received for all three delivery groups (n=16)

<table>
<thead>
<tr>
<th>Breastfeeding support received for all three delivery groups</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactation consultant in the hospital</td>
<td>12</td>
</tr>
<tr>
<td>Family members</td>
<td>12</td>
</tr>
<tr>
<td>Nurse in hospital</td>
<td>8</td>
</tr>
<tr>
<td>Lactation consultant outside of hospital</td>
<td>7</td>
</tr>
<tr>
<td>Home visiting nurse from the hospital</td>
<td>6</td>
</tr>
<tr>
<td>Online activity</td>
<td>6</td>
</tr>
<tr>
<td>Breastfeeding/new mother support group</td>
<td>4</td>
</tr>
<tr>
<td>Friends</td>
<td>3</td>
</tr>
<tr>
<td>La Leche League</td>
<td>2</td>
</tr>
<tr>
<td>Breastfeeding clinic at the hospital</td>
<td>1</td>
</tr>
<tr>
<td>Hospital lactation support line</td>
<td>1</td>
</tr>
</tbody>
</table>

The eighth interview question was, “What kind of breastfeeding support did you feel was lacking or that you wish you would have had?” The four participants who underwent a planned CD identified five areas in which they felt that breastfeeding support was lacking (see Figure 18) including wanting more assurance in the hospital when experiencing breastfeeding difficulties, noticing a lack of continuity in the hospital regarding breastfeeding advice, having too many breastfeeding appointments to attend once discharged from the hospital, not attending a breastfeeding or new mothers support group, and not having examples of other women who breastfed successfully after a CD. Comments describing the lack of assurance in the hospital
when experiencing breastfeeding difficulties involved not having the information that breastfeeding can be challenging, that successful breastfeeding can take up to six to eight weeks, as well as not having someone to talk more in depth with about milk supply concerns. One participant stated that while it was explained to her that it may take a few days for her breast milk supply to come in, she did not really receive any tips from the lactation consultant on what she could do about it in the meantime. The participant also wished that she had been encouraged to start pumping earlier. Another participant was concerned that her infant wasn’t latching properly, especially since her nipple was misshapen after nursing. Although the lactation consultant said that the latch was fine, the mother was concerned that the lactation consultant didn’t take the time to fully evaluate the infant’s latch.

One participant felt that the breastfeeding advice that she received at the hospital lacked continuity, as each lactation consultant or nurse had differing opinions and wanted to try something different. The participant found this frustrating and overwhelming. One participant experiencing breastfeeding issues ended up having to travel to frequent medical and breastfeeding appointments the first few weeks postpartum, which was exhausting for this first-time mother recovering from a CD. Another participant said that she wishes she had attended a breastfeeding or new mothers support group to talk with other mothers about similar experiences that they were going through, and obtain a broader perspective on her concerns. Another participant felt that it would have been helpful to hear stories of other women who went through a CD and succeeded at breastfeeding, giving encouragement that it can be done.
Figure 18: Breastfeeding support lacking for women with a planned Cesarean delivery (n=4)

The seven participants who had an emergency CD identified eight areas where they felt breastfeeding support was lacking (see Figure 19), including that they should have taken a breastfeeding class prenatally and/or collected more breastfeeding information prenatally, acquired more education about addressing breastfeeding problems, been able to visit an obstetrician or midwives’ office offering on-site breastfeeding support, had a more encouraging partner or someone who could be their “breastfeeding cheerleader,” not received conflicting breastfeeding advice, received more breastfeeding support from the pediatrician, had more education on pump use and more assistance on phalange sizing, received more follow up from the breastfeeding clinic, and been involved in a mom’s group.

Four of these women cited the need for more prenatal breastfeeding education, such as taking a breastfeeding class, receiving instruction on how to physically handle one’s own breast
and being comfortable with this, receiving prenatal education addressing the effects of a CD on breastfeeding, receiving prenatal education on how to trouble shoot problems and not just learning how breastfeeding should ideally go, and having an understanding prenatally that things can go wrong. One participant felt that being in a class with other women who may have had the same concerns and hearing others stories about their struggles would have been helpful.

Comments from the two women who reported a need for more education addressing breastfeeding problems included a focus on putting baby to breast more so than pumping, instruction involving the mother trying the lactation consultant’s recommendations herself instead of just watching the consultant demonstrate them, and more ideas for latching issues.

Two of the women wished they had received more breastfeeding support on-site at their OB or midwife’s office. One participant reported that she was asked by her OB how breastfeeding was going; the OB, however, did not advocate for breastfeeding or give any actual breastfeeding support. Another participant states that at postpartum visits, her midwives were helpful regarding breastfeeding, but were also pushing for her to go to a breastfeeding clinic, which would involve finding time to travel and attend another appointment.

Two women would have liked more general breastfeeding encouragement and support, such as having a more encouraging partner, someone who could be present as a breastfeeding cheerleader, or a closer social network that could encourage her to keep going. One participant would have liked more breastfeeding support from her pediatrician since the pediatrician did not have much information on breastfeeding and couldn’t answer her breastfeeding questions. One woman did not receive a postpartum home visit from a nurse and felt that this would have been helpful. One woman would have liked more information on how to use a breast pump and how
to identify the correct phalange size for the pump. She felt that using the pump was confusing, and at times she wasn’t getting any breast milk via the pump. One woman wished she had more follow-ups from the breastfeeding clinic that she attended, such as a phone call to see how breastfeeding was going. Another woman wished that she had gotten involved with a mothers group and to have a closer social network for breastfeeding support.

Figure 19: Breastfeeding support lacking for women with an emergency Cesarean delivery (n=7)

The participants who only had EA during labor and delivery and not a CD identified nine areas where they felt breastfeeding support was lacking (see Figure 20) including needing more privacy while in the hospital and at home, needing more support and help from family members when at home, receiving a breastfeeding follow-up call from the hospital once at home, receiving
more breastfeeding information while at the hospital, attending a breastfeeding support group prenatally, receiving more instruction on pumping and pump use, taking advantage of breastfeeding support, having more information on breastfeeding resources, and taking a breastfeeding class prenatally.

One participant reported that having more privacy would have helped her with focusing on establishing breastfeeding and getting breastfeeding off to a good start, as she had family coming in to visit while at the hospital and when at home. Another woman would have liked to have more support and help from family once she and her infant did arrive home. One woman would have liked more help doing things at home as she was very tired and would have preferred to have more breastfeeding support from family members.

One participant would have liked to receive a follow-up call from the hospital to address breastfeeding concerns. Another participant would have liked to receive more breastfeeding information while at the hospital, as she did not receive much support from the hospital staff. One participant wished that she had attended a breastfeeding support group prenatally since she felt she wasn’t prepared for the reality of what would happen after delivery. She felt that she would have been more prepared if she would have attended these groups prenatally to have discussion and hear what other moms were saying about breastfeeding and what issues they were dealing with. One mother would have liked to receive more instruction on pumping and breast pump use. She received her breast pump from the insurance company, and therefore did not have any face-to-face instruction on its use. She would have liked breast pump usage to be included in the breastfeeding class, as well as having a breast pump present to look at. She would have liked more encouragement to use a pump and offer bottles of breast milk earlier to her infant, as her infant did not want to take a bottle.
One woman mentioned that she wished she would have taken advantage of the breastfeeding support that was available to her when she was experiencing breastfeeding doubts. One woman, who was unable to take a breastfeeding class prenatally, wanted more information on breastfeeding resources. This would have cut down on the amount of time that it took to search for these resources. Another participant wished that she had taken a prenatal breastfeeding class.

Figure 20: Breastfeeding support lacking for women with epidural anesthesia (n=5)

Table 3 summarizes the responses of all 16 participants regarding the breastfeeding support that was lacking. The responses given by three or more participants included taking prenatal breastfeeding classes and/or receiving more information on breastfeeding prenatally,
receiving education on addressing breastfeeding problems after delivery, and attending a breastfeeding or new mother’s support group.

Table 3: Summary of breastfeeding support that was lacking (n=16)

<table>
<thead>
<tr>
<th>Summary of breastfeeding support that was lacking for all 3 delivery groups</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prenatal breastfeeding classes/information</td>
<td>6</td>
</tr>
<tr>
<td>Education on addressing breastfeeding problems</td>
<td>4</td>
</tr>
<tr>
<td>Breastfeeding/new mothers support group</td>
<td>3</td>
</tr>
<tr>
<td>Receiving more assurance in hospital when experiencing breastfeeding difficulties.</td>
<td>2</td>
</tr>
<tr>
<td>Obstetrician/Midwife offering on-site breastfeeding support</td>
<td>2</td>
</tr>
<tr>
<td>More encouraging partner/cheerleader</td>
<td>2</td>
</tr>
<tr>
<td>Education on pumping, pump use, and phalange sizing</td>
<td>2</td>
</tr>
<tr>
<td>More breastfeeding follow up from breastfeeding clinic or hospital</td>
<td>2</td>
</tr>
<tr>
<td>Too many breastfeeding appointments to attend.</td>
<td>1</td>
</tr>
<tr>
<td>Examples of success stories</td>
<td>1</td>
</tr>
<tr>
<td>More support from pediatrician</td>
<td>1</td>
</tr>
<tr>
<td>Receiving a postpartum nurse home visit</td>
<td>1</td>
</tr>
<tr>
<td>Take advantage of breastfeeding support</td>
<td>1</td>
</tr>
<tr>
<td>More privacy in the hospital and at home</td>
<td>1</td>
</tr>
<tr>
<td>More support and help from family once at home</td>
<td>1</td>
</tr>
<tr>
<td>More breastfeeding information at hospital</td>
<td>1</td>
</tr>
<tr>
<td>Information on breastfeeding resources</td>
<td>1</td>
</tr>
</tbody>
</table>
Artificial Infant Milk

The ninth interview question was, “Did you give your baby infant formula in the first two weeks after delivery? If so, what was your reason for starting formula?” All four women who underwent a planned CD gave their infants AIM within the first two weeks postpartum (see Figure 21). Reasons for AIM supplementation included that their breast milk had not come in yet, and their infant was losing weight. Two women started AIM due to their infant losing weight; one of these women referenced that her milk had not come in yet. Another woman identified the reason for AIM supplementation was that her milk had not come in yet. One infant was given AIM due to hypoglycemia.

Out of the seven women who had an emergency CD, five gave AIM during the first two weeks postpartum and two did not. The reasons that the five women gave AIM include that the mother was still unconscious in the operating room after her CD, infant weight loss, and they started supplementing more routinely after first pediatrician’s appointment. One infant started receiving AIM the first day with the SNS due to milk supply issues, followed by routine AIM supplementation after discharge and the first pediatric appointment when the infant was not gaining weight. Another infant received AIM in the hospital, as both parents were tired, mother had difficulty getting up and moving around, infant was crying, and mother’s milk had not come in yet. At this time, the nurse suggested giving a pacifier or small amount of AIM. Another mother gave AIM in the first few days postpartum as her milk had not come in yet and infant was not latching. The lactation consultant and doctor were concerned that the mother’s milk wouldn’t come in quick enough and infant wasn’t sucking on a bottle.
Out of the five women who had EA, one infant received AIM in the first two weeks postpartum and four infants did not receive AIM. The one mother that did give AIM stated that she did this because her milk did not come in until day five, and medical staff at the hospital made her feel like she was starving her baby.

Figure 21: Artificial infant milk given the first two weeks postpartum
<table>
<thead>
<tr>
<th>Participant ID Number</th>
<th>Prenatal breastfeeding education sources</th>
<th>Prenatal confidence level</th>
<th>Post-delivery confidence level</th>
<th>Difficulties or stressors identified</th>
<th>Breastfeeding support sources identified</th>
<th>Breastfeeding support that was lacking</th>
<th>AIM supplementation given</th>
<th>Duration of breastfeeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>501</td>
<td>4</td>
<td>3.5-4</td>
<td>2.5</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>Yes</td>
<td>Still breastfeeding at 12.75 months</td>
</tr>
<tr>
<td>502</td>
<td>2</td>
<td>4</td>
<td>4.5</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>Yes</td>
<td>12.5 months</td>
</tr>
<tr>
<td>503</td>
<td>2</td>
<td>3.5</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>Yes</td>
<td>Still breastfeeding at 11.5 months</td>
</tr>
<tr>
<td>504</td>
<td>3</td>
<td>4</td>
<td>3.5</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>No</td>
<td>Still breastfeeding at 19 months</td>
</tr>
<tr>
<td>505</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>Yes</td>
<td>15 months</td>
</tr>
<tr>
<td>506</td>
<td>3</td>
<td>3.5-4</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>No</td>
<td>7 months</td>
</tr>
<tr>
<td>507</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>No</td>
<td>Still breastfeeding at 13 months</td>
</tr>
<tr>
<td>508</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>Yes</td>
<td>6 months</td>
</tr>
<tr>
<td>509</td>
<td>2</td>
<td>3</td>
<td>5-Apr</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>Yes</td>
<td>2 weeks</td>
</tr>
<tr>
<td>510</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>No</td>
<td>Still breastfeeding at 14.5 months</td>
</tr>
<tr>
<td>511</td>
<td>4</td>
<td>5</td>
<td>4.5-5</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>Yes</td>
<td>15.5 months</td>
</tr>
<tr>
<td>512</td>
<td>3</td>
<td>2</td>
<td>4.5-5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>Yes</td>
<td>16 months</td>
</tr>
<tr>
<td>513</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>No</td>
<td>Still breastfeeding at 14 months</td>
</tr>
<tr>
<td>514</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>Yes</td>
<td>12 months</td>
</tr>
<tr>
<td>515</td>
<td>3</td>
<td>3</td>
<td>3-Feb</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>No</td>
<td>Still breastfeeding at 22 months</td>
</tr>
<tr>
<td>516</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>Yes</td>
<td>15 months</td>
</tr>
</tbody>
</table>
The tenth question was, “Do you have any other comments you would like to add regarding breastfeeding after a CD or EA?” The answers to this question were incorporated in the answers of the previous nine questions.

**Discussion**

The research question is, “Do women who have had a Cesarean delivery or epidural anesthesia report a lower prevalence of breastfeeding initiation and length of breastfeeding duration than women who deliver vaginally and without epidural anesthesia?” All 16 women in this qualitative study initiated breastfeeding regardless of their mode of delivery. However, looking at the demographics of the sample size, it could be expected that breastfeeding initiation and duration rates would demonstrate a higher prevalence, as women who are older, have higher education levels, and are of Caucasian or Hispanic ethnicity have been associated with higher rates of breastfeeding initiation. A more varied result of breastfeeding initiation rates may have occurred with a more diverse demographic sample.

According to the CDC’s National Immunization Survey, breastfeeding initiation rates of children born in 2010 were higher for women who were college graduates (91.2% ± 1.1) compared to women who were high school graduates (69.2% ± 2.8). Thirty-eight percent (±2.2) of women who were college graduates were still breastfeeding at 12 months postpartum, while 19.6% ± 2.8 of women who were high school graduates were still breastfeeding at 12 months. Women who were 30 years of age or older had breastfeeding initiation rates of 84.2% ± 1.3, and 33.6% ± 1.9 of these women were still breastfeeding at 12 months. Women who were 20-29 years of age had breastfeeding initiation rates of 73.6% ± 2.1, while 18.8% ± 2.0 of these women were still breastfeeding at 12 months. Eighty-four percent ± 2.4 of Hispanic women initiated
breastfeeding and 24.8% ± 3.3 were still breastfeeding at 12 months. Eighty-one percent of non-Hispanic white women initiated breastfeeding, and 28.4% ± 1.6 were still breastfeeding at 12 months. Women of other ethnicities who were represented in the National Immunization Survey, except for non-Hispanic Asian women, had lower rates of breastfeeding initiation. Women who were Hawaiian/Pacific Islander, American Indian/Alaskan Native, or who were two or more races also had lower breastfeeding initiation rates, although not necessarily lower duration rates.

No correlation was noted for the participants of this study between having a CD or EA and duration of breastfeeding, as most of the women breastfed their infants until at least around 12 months of age. Ninety-four percent of participants (n=15) breastfed their infants for at least six months; 81% of participants (n=13) breastfed their infants until at least approximately 12 months of age, and 44% of participants (n=7) were still breastfeeding at the time of the study’s interviews (the youngest infant still being breastfed at this time was 11.5 months old and the oldest was 22 months).

The three participants who breastfed for less than a year had weaning ages of two weeks, six months, and seven months. All three of these women had emergency CDs. In examining these specific situations, one participant’s breast milk supply started to decrease when she returned to work and started pumping. A second participant stated that she never developed a sufficient breast milk supply and attributed this to losing a significant amount of blood during delivery. Also, within the early postpartum period, the pediatrician was concerned the infant was not gaining enough weight, and the infant started to receive regular AIM supplementation. The third participant also lost a lot of blood during delivery and needed a blood transfusion. She still did not have a breast milk supply at four days postpartum and started to give AIM when the
pediatrician was concerned the infant wasn’t gaining enough weight. The shorter breastfeeding duration rates do not appear to have a direct correlation with having an emergency CD, but may be more related specifically to severe blood loss that was experienced by two of the women during the procedure, and the transition to work for the other participant because breast milk supply can be affected due to separation from the infant.

Henry and Britz\textsuperscript{27} addressed the issue of maternal postpartum hemorrhage and breast milk supply and indicated that this loss of blood could alter prolactin levels affecting lactogenesis II, which in turn affects breast milk supply. Prolactin is released by the pituitary gland, a gland that can be negatively affected by hypotension and blood loss. Postpartum hemorrhage can also be associated with traumatic birth, mother/baby separation, and maternal fatigue and stress, impacting lactogenesis II.

Overall, the women in this study did not demonstrate low breastfeeding initiation or duration of breastfeeding among women who had a CD or EA, and did not support the stated hypothesis that women who have CDs or EA have a low prevalence of breastfeeding initiation and duration. However, the results indicated that women who have undergone a CD could benefit from specific and individual interventions to address breastfeeding barriers, a statement that was included in the hypothesis. The women who participated in this study demonstrated commitment to breastfeeding their infants, were planning to breastfed prenatally, and were of a demographic population that has higher rates of breastfeeding initiation and duration. Many of them accessed breastfeeding resources, had breastfeeding support, and pursued breastfeeding their infant despite their encountered difficulties.
All women had some form of prenatal breastfeeding education or gathering of breastfeeding information, whether formally or informally. Many of the women who did not take a formal breastfeeding class stated that they wished they had done so. Other popular sources of breastfeeding information were childbirth education classes, books, online activity, and family and friends. While different methods can be utilized, participating in formal breastfeeding education could benefit all women, especially women contemplating breastfeeding their infants.

Breastfeeding confidence levels were in the higher range prenatally, but were found to decrease postpartum due to breastfeeding difficulties and stressors. This decrease in confidence levels could be expected in all first-time mothers.

**Barriers to Breastfeeding for Planned Versus Emergency Cesarean Delivery**

The first subproblem of the research question is, “Are there more barriers to breastfeeding depending on whether a CD was planned or an emergency procedure?” The interview question that addressed this subproblem was “Do you think your type of CD (emergency versus planned) made it any easier or harder to breastfeed your baby?” The participant responses were varied, but seemed to identify more barriers with an emergency CD versus a planned CD or EA. Seventy-five percent of the women who had a planned CD felt that having this procedure planned versus emergency made it easier to breastfeed, as they knew what to expect, could plan for their needs after a CD, and were not as physically exhausted from going through the labor process before ending up with a CD. The one participant that had a planned CD who did not feel having a planned CD made it easier to breastfeed commented that having a CD in general made it more difficult due to maternal recovery and difficulty in holding and
positioning their infant for breastfeeding due to the incision site. While going through a CD in general presents extra challenges to breastfeeding, being prepared for these challenges mentally and physically could make a difference in the breastfeeding experience and perception of it.

The participants who underwent an emergency CD had a different response than the participants with planned CDs. Twenty-nine percent were unsure whether having an emergency CD made breastfeeding more difficult, while 14% felt that an emergency CD did make breastfeeding more difficult due to the effect this news had mentally and emotionally. Fifty-seven percent of the women felt that having a CD made breastfeeding more difficult due to the physical complications, recovery, and limited physical mobility that results from the procedure, and lack of planning for additional help.

Emergency or unplanned delivery procedures may have more of an impact on breastfeeding success. According to Ahluwalia and colleagues, there was no significant correlation between the type of delivery and breastfeeding initiation rates; however, there were lower breastfeeding duration rates at four weeks and at six months for women who had emergency CDs and induced vaginal deliveries. The women who had planned CDs did not demonstrate breastfeeding duration rates as low as other women with assisted deliveries, and the authors suggested that the women with planned CDs might be more prepared for breastfeeding difficulties. The authors suggested additional breastfeeding support for women who have assisted deliveries, specifically non-planned assisted deliveries, and may not be prepared for possible breastfeeding difficulties. These women may need more breastfeeding support in the hospital and once they go home.
The medical interventions of a CD can impact breastfeeding, but the data from this study suggests that this impact affects the mother more than the infant and the infant’s ability to breastfeed. While breastfeeding can be successful after a CD, a CD in general will result in more physical recovery for the mother, which can result in the mother having more difficulty in physically breastfeeding and may need increased breastfeeding support and assistance. Women who have a planned CD have time to prepare themselves and have the opportunity to make plans to create an environment in which breastfeeding success can be maximized. This can be done by preparing themselves mentally for the surgical procedure and understanding the need for recovery, being determined to breastfeed, and setting up a breastfeeding support system that can provide quick access to professional assistance as well as general breastfeeding encouragement. They can plan for extra assistance at home after hospital discharge, which can allow them to focus on their infant and their own physical recovery. It is also beneficial to provide prenatal education on what to expect after a CD and interventions to consider when pursuing breastfeeding success after this procedure.

For women who have had an emergency CD, there may be more of a need to quickly put together a breastfeeding support system after delivery. The gathering of professional assistance may be easier to accomplish; however, the gathering of general help at home and assistance with duties around the home may be more difficult to attain for these women, depending on their family and social support network. This researcher suggests that along with creating a birth plan, women should also create a postpartum plan, taking into account what support can be drawn in if needed during this time. Hospital staff should be trained to recognize the potential need for additional breastfeeding support and encouragement for women who have had a CD, have an understanding of how to deal with aspects of physical recovery from this procedure, and provide
interventions and advice needed to pursue breastfeeding success. This may include lactation consultant visits, social work assistance as needed, and providing breastfeeding resources that can be accessed after hospital discharge.

In addressing the possibility of EA presenting breastfeeding difficulties, the interview question was asked, “Do you think EA made it more difficult to breastfeed your baby?” The women who had a vaginal delivery with EA reported no association between EA administration and negative effects on breastfeeding. The data does not support the hypothesis that women who have had vaginal births assisted by EA have increased barriers to breastfeeding success and need specialized interventions.

For women who have had EA, there seems to be no major interventions needed in respect to this specific medical intervention and supporting breastfeeding success, other than assisting the mother to breastfeed if she has limited mobility during the early postpartum period and assuring that she has access to her infant to breastfeed soon after birth and at needed intervals as indicated by normal infant feeding behavior.

Barriers to Breastfeeding for Cesarean Delivery Versus Epidural Anesthesia

The second subproblem of the research question is, “What specific barriers to breastfeeding do women have when they go through a CD or EA?” This subproblem was addressed with the interview question “What difficulties and stressors did you face in getting breastfeeding off to a good start?” For the women with planned CDs, the most cited barrier (75% of these women) was concern about their breast milk supply. A longer wait time for breast milk “coming in” (see definitions section) was seen in women who had a planned CD, with these women reporting their breast milk “coming in” at day four or five. These women demonstrated a
longer wait time for their breast milk to “come in” compared to women experiencing an emergency CD or vaginal delivery assisted with EA (see figures 22 through 24). The average timing of breast milk “coming in” for women with an emergency CD was day four, and day three for women with EA.

Figure 22: Timing of breast milk "coming in" for women with a planned Cesarean delivery

Figure 23: Timing of breast milk "coming in" for women with an emergency Cesarean delivery
The second cited barrier reported by 50% of the participants was that their infant was not gaining enough weight the first week postpartum, which may have been related to the transition to mature breast milk happening around day four or five.

Exploring the delay in lactogenesis II and infant weight loss, Preer and colleagues\textsuperscript{29} found that exclusively breastfed infants who were delivered via CD in which labor had never started, had greater neonatal weight loss. The average weight loss for these infants was 7.2% of their birthweight. The American Academy of Pediatrics\textsuperscript{30} defines neonatal weight loss up to seven percent as acceptable, but it should not exceed 10%. The authors suggest the possibility that due to labor not starting in these cases, endocrine and neuroendocrine mechanisms do not function as they would if the cascade of labor hormonal processes had started. Without entering labor, the decrease in progesterone does not happen as rapidly thereby delaying lactogenesis II. Delayed lactogenesis II is associated with greater infant weight loss. It may also be a possibility
that infants delivered via CD have extra fluid retention in their lungs which then exaggerates their birthweight, thereby identifying as an increased percentage of neonatal weight loss.

Dewey and colleagues\textsuperscript{31} found that infants whose mothers had a delay in lactation were 7.1 times more likely to have excessive infant weight loss. Infants who had a lower risk of excess weight loss were born to women who were multiparous and did not receive any medication during labor and delivery. There was a positive correlation between women who had a CD and had delayed lactation as well as having suboptimal infant breastfeeding behaviors, and the authors suggest that these women need additional breastfeeding support. They recommend that all breastfeeding mothers have a follow-up contact at day three or four postpartum.

Chantry and colleagues\textsuperscript{32} found a correlation between excessive infant weight loss and delayed lactation as well as positive maternal intrapartum fluid balance. The authors suggest that the association between positive maternal intrapartum fluid balance and excessive infant weight loss may be linked to the infant getting rid of excess fluids after delivery, but this study did not pinpoint the exact reason for this correlation. The correlation could also be linked to the infant receiving inadequate nutrition, having more wet diapers on the first day after birth, or that having excess fluids may somehow affect the infant’s efficiency at breastfeeding.

Noel-Weiss and colleagues\textsuperscript{33} suggested that an infant’s birthweight be taken 24 hours after birth to get a more accurate birthweight, and they raised the question as to whether measuring birthweight within the first few hours after birth is a true baseline for birthweight. They suggested that infants go through diuresis within the first 24 hours, and that amount of fluids can be linked to the amount of IV fluids that the mother received prior to cutting the cord. Up until day three, infant output had a positive correlation with infant weight loss. A positive association existed among infant output during the first 24 hours after birth, maternal IV fluid
intake during parturition, and infant weight loss within the first 24 hours after birth. However, exaggerated infant weight loss would only be affected by fluids within the first 72 hours after birth. Ultimately, a complete evaluation of the infant should be done if weight loss concerns arise.

For women who have had a CD, breastfeeding advice should be given with the understanding that breast milk supply may be delayed for several days. It may be beneficial to provide education on the transition from colostrum to mature breast milk, anticipate possible breast milk supply issues, and incorporate this into breastfeeding education and counseling. Mothers could also benefit from education on expectations for infant weight gain and implementation of interventions in these situations that have been developed to help support breastfeeding and minimize AIM supplementation. Further research on addressing infant weight loss during the neonatal period and when AIM supplementation is medically necessary is recommended.

In addition to the breastfeeding difficulties of breast milk supply and infant weight loss, a third barrier cited by 50% of women who had a planned CD involved needing more breastfeeding guidance during the early postpartum period. Having breastfeeding resources available and easy to access for these women also plays an important role in early breastfeeding success.

Forty-three percent of the women who had an emergency CD cited breast milk supply as a difficulty, which also was common for women who had a planned CD. The data presented in this study indicated that breast milk supply could be an issue for all women who have a CD.
For women with emergency CDs, 71% of these women reported difficulty with nipple soreness and pain, 57% reported latching difficulties, and 43% reported positioning difficulties. It is unclear why these issues were so highly reported by the women who had emergency CDs but not planned CDs, as these issues could be related to the CD procedure and the uncomfortableness of the incision site. First-time mother uncertainty was cited by 57% of these women, which could also be complicated by having an unplanned and unexpected surgical procedure.

Forty-three percent of the women who had an emergency CD also cited breast milk supply as a difficulty, which also was common for women who had a planned CD. The data presented in this study indicated that breast milk supply can be an issue for all women who have a CD.

Tully and Ball examined breastfeeding challenges after a CD. They interviewed 115 women between February 2006 and 2009 within an average of 1.5 days after their CDs. Breastfeeding obstacles that were identified included limited maternal mobility, pain at the incision site, maternal tiredness, needing breastfeeding assistance, and difficulty in positioning the infant for breastfeeding. Difficulties identified that were specifically associated with the infant involved latching difficulties, infant not appearing to be satiated after breastfeeding, infant’s lack of interest in breastfeeding, and the need for expulsion of mucus after a CD in order for the infant to breastfeed effectively. Mothers reported that they would have liked more information during the antepartum period regarding how their infants would be affected by a non-labor birth. The authors suggest that mothers may benefit from receiving antepartum guidance on maternal and infant barriers after a non-labor CD, and from receiving individualized breastfeeding support based on their needs.
Women who had a vaginal delivery with EA cited maternal exhaustion, frequency of nursing, lack of support, and difficulty latching as some of their more cited breastfeeding difficulties. None of these breastfeeding difficulties appeared to be related to EA administration, but rather more typical breastfeeding difficulties after childbirth. Maternal exhaustion may be attributed to longer labor. With EA, most of the women had their breast milk “come in” within the first 2 to 3 days which may have led to more frequent nursing in the first few days postpartum.

**Breastfeeding Support Needed**

The third subproblem of the research question is, “What specific breastfeeding support needs do mothers have after going through a cesarean delivery or epidural anesthesia?” This subproblem was addressed by exploring what breastfeeding support the participants received and what breastfeeding support they felt was lacking. The more frequently reported sources of breastfeeding support from women who had a planned CD included the lactation consultant at the hospital, the home visiting nurse from the hospital, and family support. Breastfeeding support more frequently reported by women who had an emergency CD included the lactation consultant and nurse in the hospital, family members, the lactation consultant at the pediatrician’s office, and online searches. Breastfeeding support more frequently reported by women who had EA included family members, the lactation consultant at the hospital, a breastfeeding support group, and online searches.

Breastfeeding rates and duration were similar among most of the participants regardless of delivery type; however, breastfeeding support received varied between the three different delivery groups. Women with CDs received more professional breastfeeding assistance while in
the hospital as well as the early postpartum period after hospital discharge. This may be due to women with higher risk and surgical deliveries being flagged for provision of more breastfeeding support in the hospital. Looking at the women who had a CD, whether planned or emergency, 82% identified the lactation consultant in the hospital as a source of support while 64% identified the nurse in the hospital, 55% identified a lactation consultant outside of the hospital, and 45% identified the postpartum nurse home visit. Seventy-three percent of women who had a CD identified family as a source of breastfeeding support, 36% identified online searches, 18% identified friends, and 18% identified a new mother breastfeeding support group.

Women who had EA reported more non-professional breastfeeding support, identifying family support as the most highly reported form of breastfeeding support, followed by support at the hospital. Out of the women who had EA (n=5), 60% identified the lactation consultant at the hospital as a source of breastfeeding support, 40% identified a lactation consultant outside of the hospital, 20% identified the nurse at the hospital, and 20% identified the postpartum nurse home visit as a source of support. All women who had EA identified their family as a source of breastfeeding support, 40% identified a new mother breastfeeding support group, 40% identified on-line searches, and 20% identified friends. While all breastfeeding women can benefit from professional breastfeeding support, assuring that women who have had a CD have access and receive professional breastfeeding support could be beneficial to their breastfeeding success.

Looking at breastfeeding support that the women would have liked, women who had planned CDs reported that breastfeeding support was lacking. They reported a need for receiving more assurance in the hospital when experiencing breastfeeding difficulties, experiencing a lack of continuity in breastfeeding advice received at the hospital, having too many breastfeeding appointments to attend, wishing that they attended a new mother’s
breastfeeding group, and hearing examples of breastfeeding success stories of women who have had a CD.

Breastfeeding support that was lacking for women with an emergency CD included that they should have taken a prenatal breastfeeding class, would have liked more education on breastfeeding problems, and would have liked their obstetrician or midwife to offer breastfeeding support on-site. The women with emergency CD also wanted to have a more encouraging partner or breastfeeding cheerleader, more support from the pediatrician, a postpartum nurse home visit, education on pump use and phalange sizing, more follow-up from the breastfeeding clinic, and involvement in a new mother’s group.

Breastfeeding support that was lacking for women with EA included privacy in the hospital and at home, enough support and help from family when at home, breastfeeding follow-up from the hospital, needing more breastfeeding information from the hospital, attending a breastfeeding support group prenatally, more instruction on pumping and pump use, taking advantage of breastfeeding support, information on breastfeeding resources, and taking a breastfeeding class. The women who had EA tended to report the need for more breastfeeding support and encouragement, understanding the reality of breastfeeding once at home, and receiving general breastfeeding information. Women with EA may not have been seen as needing extensive breastfeeding support in comparison to women who had a CD, and thereby not receiving as much breastfeeding support.

Breastfeeding support that was lacking for women with CDs, whether planned or an emergency, focused more on professional breastfeeding support, while breastfeeding support that
was lacking for women who had EA focused more on breastfeeding information and support once at home.

Combining the responses from all three groups of participants, breastfeeding support that was lacking and that was mentioned by more than two participants included taking a prenatal breastfeeding class/receiving prenatal breastfeeding information, learning how to address breastfeeding problems after delivery, and attending a breastfeeding or new mother’s support group. This highlights the importance of breastfeeding education prenatally, receiving professional support after delivery, and connecting with a supportive peer group.

AIM supplementation to infants in the early postpartum period was given by all women who had a planned CD and by 71% of women who had an emergency CD. Only one of the women who had EA gave AIM supplementation to her infant, due to her breast milk not “coming in” until day five. There was a greater rate of AIM supplementation for women who had a CD versus a vaginal delivery. Although one infant received AIM supplementation due to hypoglycemia, the increase in AIM supplementation for these women appeared to be due to their breast milk “coming in” later and concerns regarding infant weight gain. For women with CDs, interventions should be implemented to address the increased possibility of AIM supplementation.

Limitations of the Study

Limitations of this study included the lack of data regarding the exclusivity of breastfeeding at various months after delivery and when complete cessation of breastfeeding took place for all participants, since not all of the interviews took place after complete cessation of breastfeeding. It also would have been more ideal if all participants were interviewed at the
same week of their postpartum period, as perceptions may change as more time passes between delivery, initial breastfeeding experience, and the present.

Additionally, this study would also benefit from having a larger sample size and more diverse demographics. The demographics of the participant sample were limited to primarily Caucasian women in their thirties and forties from the Ann Arbor, Michigan area, and education level ranged from a bachelor’s degree to master’s degree and a PhD degree.
Chapter 5: Conclusions and Recommendations

All women can benefit from breastfeeding support and encouragement. Many women face difficulties as they initiate breastfeeding. Breastfeeding education is important during the prenatal period and breastfeeding support, guidance, and encouragement is important in the postpartum period. Women who go through CDs may be in need of additional breastfeeding support and guidance and interventions should be put into place to assist them in meeting their breastfeeding goals and minimizing AIM supplementation.

While women who delivered vaginally with the assistance of EA did not demonstrate a need for specialized breastfeeding interventions, women who have had a CD, whether planned or an emergency, were found to be more at risk for breastfeeding difficulties and could benefit from additional breastfeeding support and guidance. To assist these women in meeting their breastfeeding goals, specific breastfeeding interventions and guidelines are recommended for these women to address maternal recovery and functionality, breast milk supply, expectations surrounding infant weight gain, and extra breastfeeding and general support that will be needed, whether professional or non-professional. It has been noted that rates of CDs are on the rise in the U.S. and providing support for these mothers and their infants can assist them in achieving positive health outcomes now and more positive health outcomes in the future.

Recommendations for future research include addressing breastfeeding support and education needs to develop specific interventions for women who had a premature infant via CD, as feeding a premature infant brings with it additional barriers to breastfeeding success. There would also be merit in looking into at differences in breastfeeding needs and interventions for women of other demographics such as education level, socioeconomic status, and ethnicity.
Future research focusing on the effects of medical complications, as a result of a CD (such as severe blood loss), on the mother’s breast milk supply would also provide insight into understanding breastfeeding support and education needs for these women.
References


Appendix A: UHSRC Approval

RESEARCH @ EMU

UHSRC Determination: EXPEDITED INITIAL APPROVAL
DATE: March 5, 2015
TO: Joy Petzoldt, BS
Eastern Michigan University
Re: UHSRC: # 721625-1
Category: Expedited
Approval Date: March 5, 2015
Expiration Date: March 5, 2016

Title: Breastfeeding Education and Support Needs for Women after a Cesarean Delivery or Epidural Anesthesia

Your research project, entitled Breastfeeding Education and Support Needs for Women after a Cesarean Delivery or Epidural Anesthesia, has been approved in accordance with all applicable federal regulations.

This approval included the following:
1. Enrollment of 25 subjects to participate in the approved protocol.
2. Use of the following study measures: Participant Interview Form
3. Use of the following stamped recruitment materials: Participant Recruitment Message
4. Use of the stamped: Participant Informed Consent Form

Renewals: This approval is valid for one year and expires on March 5, 2016. If you plan to continue your study beyond March 5, 2016, you must submit a Continuing Review Form by February 4, 2016 to ensure the approval does not lapse.

Modifications: All changes must be approved prior to implementation. If you plan to make any minor changes, you must submit a Minor Modification Form. For any changes that alter study design or any study instruments, you must submit a Human Subjects Approval Request Form. These forms are available through IRBNet on the UHSRC website.

Problems: All major deviations from the reviewed protocol, unanticipated problems, adverse events, subject complaints, or other problems that may increase the risk to human subjects or change the category of review must be reported to the UHSRC via an Event Report form, available through IRBNet on the UHSRC website.

Follow-up: If your Expedited research project is not completed and closed after three years, the UHSRC office requires a new Human Subjects Approval Request Form prior to approving a continuation beyond three years.

Please use the UHSRC number listed above on any forms submitted that relate to this project, or on any correspondence with the UHSRC office.

Good luck in your research. If we can be of further assistance, please contact us at 734-487-3090 or via e-mail at human.subjects@emich.edu. Thank you for your cooperation.

Sincerely,
Joan Cowdery, PhD
Vice Chair
University Human Subjects Review Committee
Appendix B: Participant Recruitment Message

Participant Recruitment Message

Hello and congratulations on your new baby! My name is Joy Petzoldt and I am a Registered Dietitian currently working on getting my Master’s degree in Human Nutrition at Eastern Michigan University. As part of my thesis work I am doing a research project that focuses on whether women who had a cesarean delivery or epidural anesthesia breastfed their babies, what kinds of breastfeeding barriers they encountered, what breastfeeding support they had, and what additional breastfeeding education and support could have been helpful.

I am looking for 15-25 women to interview to get their perspective on breastfeeding after a cesarean delivery or epidural anesthesia. You are eligible to participate if you are over 18 years of age, had your baby between June 2013 and April 2015, breastfed or prenatally were planning to breastfeed your baby, had a singleton pregnancy, your baby was not born premature, your baby was over 5 pounds 8oz at birth, and neither you or your baby have any medical problems.

The interview will consist of ten questions and will last approximately 30 minutes. In addition to the ten questions, I may ask you a few additional questions to make sure I understand your answers completely. There are no right or wrong answers. I just want to hear about your experience and thoughts on this topic. The interview will be audio recorded to make sure that I do not miss anything that you said, however this recording will be erased as soon as I am done writing my report. You will receive a small gift of appreciation for your participation. Your participation is completely voluntary, and you may withdraw your participation at any time. If you agree to participate we will schedule a time and place for your interview. Thank you for your consideration!
Appendix C: Participant Informed Consent Form

Participant Informed Consent Form

**Research study:** Breastfeeding Education and Support Needs for Women after a Cesarean Delivery or Epidural Anesthesia.

**Investigator:** Joy Petzoldt-Hansell, RD, Eastern Michigan University, Master’s Program in Human Nutrition

**Co-Investigator:** Alice Jo Rainville, PHD, RD, CHE, SNS, Thesis Chair

Contact information: alicejo.rainville@emich.edu, (734) 487-0430

**Purpose of the study:** The purpose of this study is to research the connection between women having a cesarean delivery or epidural anesthesia and whether these women decided to breastfeed, and how long they breastfed. This study will also look at the breastfeeding barriers and support needs of women and work towards understanding what specific breastfeeding support would be helpful for these women.

**Procedure:** Participants will be selected via response to a recruitment e-mail. You will be eligible for this study if you are 18 years of age or older, have delivered your baby by cesarean delivery or with epidural anesthesia between the months of June 2013 and April 2015, did not had a premature or low birth weight baby, did not have a multigestational delivery, you and your baby do not have specific medical conditions, and you have either breastfed your baby, or when pregnant had plans of breastfeeding your baby. The medical issues that would exclude you and your baby from this study include breast reduction/augmentation surgeries, physical limitations that you or your baby have that would interfere with facilitation of breastfeeding, and any condition that you or your baby had that would require treatments or medications that would interfere with opportunities to breastfeed. Medical conditions specific to your baby would include developmental syndromes or delay, neural tube defects, cleft lip or palate, and gastrointestinal abnormalities. If there are any questions about whether certain medical conditions would exclude you and your baby from participating in this study, please discuss these with the interviewer.

You will be interviewed in person using a ten question interview. This interview will last about 30 minutes. These questions will address the breastfeeding education you received during pregnancy, your self-confidence in breastfeeding, breastfeeding difficulties you experienced after your delivery, breastfeeding support that you received after delivery, and breastfeeding support that you did not receive but would have liked to have had. The interview will be audio recorded, with your permission, to make sure that the interviewer does not miss anything. If you prefer to not be audio recorded please let the interviewer know, and sign on the declination line at the end of this form. There will not be any penalty for declining the audio recording, and the interview will continue as described. Before the interview starts, you must sign the informed consent form in order to participate. You will be mailed the results of this study.

Approved by the Eastern Michigan University Human Subjects Review Committee
UHSC Protocol Number: 721625-2
Study Approval Dates: 3/21/15 – 3/05/16
Confidentiality: You will be assigned a number for identification purposes in order to protect your confidentiality. Your name or any other personal identifying information will not be on these records. These records will be locked up whenever not in use. The interview will be done in private with only you and the interviewer, and anyone else that you have given permission to be present. If a private location is not available and you agree to have the interview done in a more public setting, such as the general area of a public library, you will need to sign the waiver at the end of this form to waive having the location of the interview in a private room. The interviewer will work to maintain as much privacy as possible during the interview, and if there are certain questions that you do not feel comfortable answering in a public area, you may decline to answer these.

During the interview, you will be allowed to remove any information you give from the notes that are being taken, if you decide that you do not want it to be a part of the research study. Your address and/or e-mail address will be recorded on a separate record during the process of storing and collecting the study information for the purpose of sending you the results of this study. Once the research study is completely over, any records and information that was recorded will be destroyed or deleted.

Expected risks: There are no expected risks to you by participating in this study. Direct risks that you could face by participating in this research study may be emotional if talking about your delivery and breastfeeding experience is upsetting for you. If it is something that you do not wish to continue talking about, please let the interviewer know.

Expected benefits: While you may feel more empowered as a mother, as your experiences may help with the research that is being done, you will not directly benefit from participating in this research.

Compensation: You will receive a gift of appreciation for your participation in this study. The gift will be a $10.00 gift card to The Little Seedling in Ann Arbor, Michigan.

Voluntary participation: Your participation is voluntary, and you can request to stop the interview at any time. There will not be any negative consequences if you decide to end your participation before the interview is over. Also, this will not disqualify you from receiving the gift of appreciation for your participation.

Use of research results: The research study results will be printed in a professional journal, and the interviewer will also present them at a professional meeting. Your name or any information that could personally identify you will not be used in any of these situations. Other groups may have access to your research information for quality control or safety purposes. These groups include the University Human Subjects Review Committee, the Office of Research Development, the sponsor of the research, or federal and state agencies that oversee the review of research. The University

Approved by the Eastern Michigan University Human Subjects Review Committee
UHSRC Protocol Number: 721625-2
Study Approval Dates: 3/21/15 – 3/05/16
Human Subjects Review Committee is responsible for the safety and protection of people who participate in research studies.

**Future questions:** If you have any questions concerning your participation in this study now or in the future, you can contact the principal investigator, Joy Petzoldt, at (734) 476-6052 or by e-mail at jpetzold@emich.edu. For questions about your rights as a participant in research, please contact the Eastern Michigan University Human Subjects Review Committee at 734-487-3090 or human.subjects@emich.edu. If you have questions about the approval process, please contact the Director of the Graduate School (734.487.0042, human.subjects@emich.edu).

**Consent to participate:**

PRINT NAME: ___________________________ Date __________

Participant signature: ___________________________ Date __________

Investigator signature: ___________________________ Date __________

**Audio recording declination:** I do not wish to be audio recorded.

Participant signature: ___________________________ Date __________

**Permission for others to be present during the interview:**

I give permission for ___________________________ to be present during this interview.

Participant signature ___________________________ Date __________

**Permission to conduct the interview in a public area:**

I give permission to conduct this interview in a public area, and I understand that I do not have to answer any questions that I do not feel comfortable answering in this environment.

Participant signature: ___________________________ Date __________
Appendix D: Participant Interview Form

Participant Interview Form

Breastfeeding Education and Support Needs for Women after a Cesarean Delivery or Epidural Anesthesia: Participant Interview Form

Participant ID#: ____________  Age: _________  Education level  _______________
Race/Ethnicity: _________________  *Type of delivery: _____________________________
If cesarean delivery, emergency or planned? _________________________________
If epidural, what type of anesthesia? ________________________________________
*Multifetal gestation? _____  *Infant’s gestational age: _____  *Birthweight: _______
Infant’s age at time of interview: ___________________________________________
*Do you or your infant have any medical problems? ____________________________
Number of children: _____  How many of your children were breastfed? _________
How long did you breastfeed your other children? _____________________________
*Did you breastfeed your most recent child? _________________________________
If yes, how long did you breastfeed him/her for, or how long are you planning to breastfeed?
_________________________________________________________________________
*If no, during your pregnancy were you planning on breastfeeding? _______________

1. Did you have any prenatal breastfeeding education? Explain.

2. On a scale of 1 to 5 (1 being no confidence and 5 being very confident) how confident were
   you in breastfeeding your baby before you delivered?
3. On a scale of 1 to 5 how confident were you in breastfeeding your baby after delivery?

4. If cesarean delivery: Do you think your type of cesarean delivery (emergency versus planned) made it any easier or harder to breastfeed your baby?

5. If epidural anesthesia: Do you think epidural anesthesia made it more difficult to breastfeed your baby?

6. What difficulties and stressors did you face in getting breastfeeding off to a good start?

7. What type of breastfeeding support did you receive and from whom?

8. What kind of breastfeeding support did you feel was lacking or that you wish you would have had?
9. Did you give your baby infant formula in the first two weeks after delivery? If so, what was your reason for starting formula?

10. Do you have any other comments you would like to add regarding breastfeeding after a cesarean delivery and/or epidural anesthesia?

*Questions with an asterisk will be instrumental in determining the subject’s eligibility to participate in the interview, depending on their response.