

The Forgotten Tool of Breastfeeding Success:
Cup-Feeding the Infant Who is Struggling to Breastfeed

Marissa Baer

Carroll College

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SIGNATURE PAGE

This thesis for honors recognition has been approved by the
Department of Nursing at Carroll College, Helena, MT.

_____ Prof. Stephanie Burkholder, MN, APRN, FNP-BC Committee Director	_____ Date
_____ Prof. Meredith Krutar, MSN, FNP-BC Reader	_____ Date
_____ Prof. Katherine Wagner, MS Reader	_____ Date

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Dedication

This thesis is dedicated to breastfeeding mothers and mothers with ill infants everywhere. Motherhood is a gift as well as the birth of every child. I hope this thesis brings light to the intervention of cup feeding and gives understanding to the importance of evidence based practice. Every small life is important and the support of healthcare providers to mothers with sick infants is vital to the improvement of infant life.

Abstract

Though a mother's body is ready to provide nourishment through breastfeeding after birth, not every infant may be ready to feed at the breast. Cup feeding is one of many tools that can be used to support successful breastfeeding. A cup (e.g. medicine cup, bottle lid, paladai cup) is placed to the infant's lips to simulate the natural suck-swallow-breath pattern and to allow the infant's own control of intake. The World Health Organization recommends cup feeding as a tool for infants who require an alternative feeding method. However, whether cup feeding has actually been implemented into practice or recommended by healthcare providers remains unclear. The objective of this study was to inquire if cup feeding has been recommended to mothers in Lewis & Clark County, MT compared to Snohomish County, WA as a tool to increase breastfeeding success. Using a convenience sample, surveys (either paper or online) were completed by over 200 mothers between November 2019 and March 2020. The survey was anonymous, offered in English or Spanish, and asked mothers to answer questions about their demographics, past maternal history, and experiences with breastfeeding and cup feeding. Very few mothers in both counties have been offered or suggested cup feeding as a tool to help with breastfeeding. The majority of participants in the study reported being open to cup feeding if educated on cup feeding benefits. Therefore, the results suggest that there is an interest in cup feeding but a lack of implementation and education regarding it as a tool for breastfeeding success.

Chapter I:

Background

A human's earliest source of nourishment is through the umbilical cord in utero. Though a mother's body is ready to provide the next lifeline after birth through breastfeeding, the infant may not always be ready to breastfeed. Some infants are born prematurely or are born with defects such as physical deformities that impede their ability to successfully breastfeed. It is the role of the nurse and supportive team to offer all the tools available for the mother or caregiver to feed the infant if breastfeeding is not immediately possible.

Cup feeding is one of many beneficial tools that can be used when immediate breastfeeding is not possible. The infant is held upright with a small cup resting at the bottom lip. During feedings, the infant controls the amount and speed of the expressed breastmilk and is able to practice suck-swallow-breathe patterns. Compared to traditional approaches like a nasogastric tube or bottle, cup feeding has been shown to offer smoother transitions to the breast when the infant is ready to breastfeed (Rocha, Martinez, & Jorge, 2002). Other studies suggest that "cup feeding significantly increases the odds of full breastfeeding at discharge" (Collins et al., 2004, p. 194) and is physiologically safe (Marinelli et al., 2001, p. 352). Additionally, the World Health Organization recommends that "infants [especially those who are low birth weight] who need to be fed by an alternative oral feeding method should be fed by cup" (WHO, 2019). With its known benefits and recognition from the World Health Organization as being a beneficial tool for infant feeding, it would be assumed that cup feeding is welcomed into neonatal and postpartum units as part of evidence based nursing care.

Despite both national and global research on cup feeding and its assumed benefits towards breastfeeding success, there is a lack of education and correct utilization of cup feeding in the hospital setting (Olaogun et al., 2015). The general attitude towards cup feeding by healthcare providers is negative with a multitude of misconceptions regarding its effects on breastfeeding success and an overall lack of knowledge regarding cup feeding (Ghareeb, 2015). As a result, there is a gap in breastfeeding support which places mothers with vulnerable infants at a disadvantage when striving to feed from the breast.

Purpose Statement

The aim of this study is to answer the following question: In breastfeeding mothers residing in Lewis & Clark County, MT compared to Snohomish County, WA has cup-feeding been recommended as an intervention for breastfeeding success? The intent is that this study will give a new perspective to healthcare providers, especially nurses, in regards to recommending alternative breastfeeding tools, such as cup feeding, to those with infants struggling to breastfeed. The findings may assist parents, caregivers, and nurses in using early feeding techniques, such as cup feeding, that may support exclusive breastfeeding.

Introduction

It is the role of the nurse to ensure the best patient care possible. Utilizing evidence-based practice is one component of delivering the best care for all patients. Ingersoll (2002) states, “evidence based practice (EBP) is the conscientious, explicit, and judicious use of theory-derived, research-based information in making decisions about care delivery to individuals or groups of patients and in consideration of individual needs and preferences” (as cited in Schmidt & Brown, 2015, p. 4). In recent years, the use of cup feeding has become part of evidence based practice in caring for infants struggling to breastfeed. In order to properly address cup feeding and its significance, this chapter will define cup feeding, cup feeding compared to its counterparts (i.e. bottle feeding), and the suggested benefits of cup feeding in connection to breastfeeding success.

Definition of Cup Feeding

Cup feeding is an alternative to other means of infant feeding (e.g., bottle feeding, tube feeding, syringe feeding) when immediate breastfeeding is not possible. It involves the use of a small cup, ideally with a spout on the edge. The cup can be a thirty milliliter medicine cup, a bottle lid, or a paladai cup which is a “cup-like utensil with a narrow tip that has been used traditionally to feed babies in India when mothers cannot breastfeed” (Tsao, 2018).

With any cup, proper training is necessary to minimize spillage and ensure adequate intake. The infant is held upright and delivered small amounts of breastmilk slowly by mouth. In this manner, the infant is required to drink and breathe with more coordination. Compared to bottle feeding, cup feeding supports better latch when the infant is introduced to the breast, decreases the incidence of nipple confusion, and is cost

effective for mothers living in underdeveloped countries (Yilmaz, Caylan, Karacan, Bodur, & Gokcay, 2014).

The Cup Feeding Process

With any patient care, standard precautions are critical to prevent the spread of illness. Infants are especially vulnerable due to their developing immune systems. Therefore, the first steps in cup feeding are hand washing and cup cleaning with soap and water (WHO, 2019). Next, the cups are sterilized by placing them in a covered pot of boiling water. If cups are not immediately needed, the cups should be taken out with tongs or forceps (preferably sterilized) and covered in a clean place.

The World Health Organization recommends feeding at the breast as the first choice in infant feeding. If breastfeeding is not possible, hand expression or pumping may be used to extract breastmilk and give to an infant, preferably with a cup. If a pump is not available, hand expression may be used to obtain breastmilk (La Leche League, 2019).

When the supplies and breastmilk are ready, the infant can be stimulated by gently stroking the infant's cheek. The rooting reflex along with licking of the lips, thumb sucking, and finger sucking are all signals that an infant is hungry. Other signs that the baby is ready to cup feed include opening and closing the mouth, lip smacking, alertness, an increase in activity, and head turning towards the breast (WIC Breastfeeding Support, 2019).

Ideally, expressed breastmilk should be consumed soon after expression. However, if the breastmilk is stored and rewarmed with a warm water bath, the person who is cup feeding the infant should always test the breastmilk temperature with the inner

portion of the wrist (WHO, 2019). The caregiver should ensure that the infant is calm, awake, and alert. The infant should then be swaddled and held upright with a bib under their chin. The cup should be no more than half full of expressed breastmilk. While holding the baby in an upright position with one hand supporting the head and neck, the caregiver should hold the cup to the baby's bottom lip resting at the corners of the mouth. The caregiver should encourage small sips and take care not to pour the milk into the infant's mouth. In this position, the baby can lap up the milk, while bringing the tongue forward. The cup should be kept in this position until the baby pulls away from the cup. Feeds can take anywhere from 15-30 minutes with volumes dependent on gestational age and developmental level (Australian Breast-Feeding Association, 2019). In this manner, an infant who is struggling to breastfeed can consume expressed breastmilk and gain the many nutrients and other benefits that only breastmilk can provide.

Exclusive Breastfeeding & Breastfeeding Success

Overall, the goal of breastfeeding is exclusive breastfeeding; defined as only receiving breastmilk through the breast and no other delivery methods (i.e. bottles, cups, spoons, nipple shields) being used (WHO, 2019). For the purpose of this thesis, success in breastfeeding includes continuation of breastfeeding once discharged from a hospital if applicable, adequate suck-swallow-breathe ability once fully transitioned to breast (i.e. exclusive breastfeeding), and long term growth/development for infants struggling to breastfeed. Breastfeeding provides long-term health benefits for premature infants. Infants who are breastfed exclusively until six months of age are at reduced risk for the development of asthma, obesity, type II diabetes mellitus, and ear and respiratory infections (CDC, 2018).

Breastmilk and the Infant

Breastfeeding occurs as a negative feedback loop. As oxytocin releases from the mother's pituitary gland, a tingling sensation from the breast occurs and milk flows from the milk ducts. The baby suckles at the breast and milk flows if suckling continues. If the suckling is inadequate, interrupted, or if the latch is weak, then the flow of milk will stop or be impeded (WHO, 2009).

Human breastmilk provides all of the important nutrients, enzymes, and antibodies needed to sustain early life. The American Academy of Pediatrics (CDC 2019b), recommends exclusive breastfeeding for at least 6 months, and then continuing to breastfeed in addition to complementary foods until 12 months of age or older. This provides ideal nutrition and supports optimal growth and development. During this growth and development, breastmilk changes to meet the infant's nutritional needs. Additionally, the infant acquires temporary passive immunity from Immunoglobulin A, which coats the lining of an infant's intestines to protect against a variety of germs and allergens (Cleveland Clinic, 2019). Over the years, education on the above benefits of breastfeeding has increased breastfeeding rates in the United States (CDC, 2018a). Among infants born in 2015 in the United States, 83.2% started to breastfeed, 57.6% were still breastfeeding at 6 months, and 35.9% were still breastfeeding at 12 months. Compared to rates for infants born in 2014, rates for infants born in 2015 increased for breastfeeding at both 6 and 12 months (CDC, 2018a).

Regarding breastfeeding, the target percentages for breastfeeding rates set by Healthy People 2020 are the following: (1) Ever breastfed: 81.9%, (2) breastfed at 6 months: 60.6%, (3) breastfed at 1 year: 34.1%, (4) exclusively breastfed through 3

months: 46.2%, and (5) exclusively breastfed through 6 months: 25.4%. Additionally, Healthy People 2020 set a goal to “reduce the proportion of breastfed newborns who receive supplementation within the first 2 days of life” with a target percentage of 8.1% (Healthy People 2020).

The Breastfeeding Report Card 2018 uses data gathered from 2015 to track progress on Healthy People 2020 goals. As of 2015, CDC statistics indicate in Washington that 92.4% ever breastfed, 72.7% breastfed at 6 months, 48.2% breastfed at 12 months, 58.9% exclusively breastfed through 3 months, and 29.1% exclusively breastfed through 12 months. Comparatively, 2015 statistics in Montana indicated 83.9% ever breastfed, 61.1% breastfed at 6 months, 40.5% breastfed at 12 months, 56.8% exclusively breastfed through 3 months, and 35.7% exclusively breastfed at 12 months (CDCc, 2015).

When comparing Healthy People 2020 Breastfeeding Goals with Washington and Montana, it is noted that the statistics from Washington exceed Montana statistics in the categories of ever breastfed (92.4% vs 83.9%), breastfeeding at 6 months (72.7% vs 61.1%) breastfeeding at 12 months (48.2% vs 40.5%), and exclusive breastfeeding at 3 months (58.9% vs 56.8%). Montana was higher in the category of exclusive breastfeeding at 12 months (35.7% vs 29.1%). Both states met the goals of Healthy People 2020.

Breastfeeding Difficulty

Of the complications that contribute to difficultly breastfeeding, several can be associated with a variety of maternal and neonatal sources. Specific to the neonate, the suck-swallow reflex may be the source of difficulty. Infants can grasp a nipple as early as

28 weeks and suckle. However, coordination of sucking and swallowing typically appears between 32 and 35 weeks of pregnancy. At this age, they can suckle and take supplementary feeds by cup (WHO, 2009). As the efficacy of the suck-swallow reflex can be dependent on gestational age of the infant, those born before 35 weeks may have difficulties breastfeeding. Aside from preterm infants, breastfeeding difficulties, in general can result from physical deformities, adverse reactions to breastmilk, or maternal factors (e.g. drug use, social beliefs (i.e. job pressures), mastitis and pain with feeding etc.).

Signs of breastfeeding difficulty may be categorized into early and late signs. Early signs may include pain with breastfeeding (especially in first time mothers), spitting up, coughing, inadequate latch, and crying. Later signs may include breast engorgement and mastitis, less than 6 wet diapers by the fifth day of life (indication of low intake and/or poor milk production), less frequent feeds, and need for formula (Spencer, 2020).

Failure to thrive (FTT) is the more serious sign of breastfeeding difficulty. This clinical finding includes infants that have a weight or rate of weight gain that is significantly below that of other infants similar in age and sex (John Hopkins, 2019). In the United States, an estimated 80% of children with FTT present before 18 months of age (Cole et al., 2011). Globally, 26% of children under five experience FTT; this percentage reaching 40% in sub-Saharan Africa and South Asia and 50% in developing countries (Ross et al., 2017). It is worthy to note breastfeeding difficulties are on a spectrum and FTT is at one end of that spectrum.

It is the role of the nurse and supportive team to assess for complications of breastfeeding difficulty and intervene when early signs of difficulties appear to prevent later signs from occurring. During breastfeeding support, the way in which breastmilk is delivered may help or hinder breastfeeding efforts.

Exclusive breastfeeding is not always possible due to the many difficulties described in the previous section that can develop during an infant's critical window to breastfeed. Historically, breastmilk has been delivered through nasogastric or gastric tubing in the NICU when feeding is deemed difficult. Cup feeding is one useful technique in which the parent or care provider feeds the infant through a small silicone cup. Current forms such as bottles, spoons, nipple shields (plastic coverings that are applied to the breast to help facilitate breastfeed), and artificial nipples are more commonly used for temporary support (March of Dimes, 2017).

In bottle feeding, breastmilk is given through an artificial nipple. Once accustomed to suckling on an artificial nipple, infants may struggle to latch onto a human nipple. Termed 'nipple confusion', this roadblock can cause problems when transitioning an infant to the breast (La Leche League, 2019). Nipple confusion can also be seen in the use of nipple shields. Cup feeding has been shown to decrease rates of nipple confusion (Yilmaz, Caylan, Karacan, Bodur, and Gokcay, 2014).

Often times, both the mother and her infant struggle during breastfeeding. According to Women, Infants and Children (WIC), there are a variety of challenges that can appear that make breastfeeding more difficult for the infant who is already struggling. Difficulties with the mother can include, sore nipples, low milk supply, engorgement, plugged milk ducts, fungal infections, breast and nipple size and shape, exhaustion, and

feelings of depression (WIC, 2019). According to the American Academy of Pediatrics, the only contraindication specific to the mother in her efforts to breastfeed is if she is HIV positive (AAP, 2019). With any challenge or difficulty, whether from the neonate, mother, or both, education and support are necessary in neonatal/maternal care.

Breastfeeding Support

With any difficulty, method of delivering breastmilk, age or birthweight, early support in breastfeeding is critical to breastfeeding success. Several recommendations were analyzed: (1) The CDC Guide to Strategies to Support Breastfeeding, (2) the Baby Friendly Initiative (BFHI), (3) 10 Steps for Breastfeeding Success, and (4) WHO recommendations for cup feeding the infant struggling to breastfeed.

The CDC Guide to Strategies to Support Breastfeeding mentions a list of support personnel such as doctors, nurses, or lactation consultants. Additionally, “Professional support can be given in many different ways and settings—in person, online, over the telephone, in a group, or individually. Some women receive individual in-home visits from health care professionals, while others visit breastfeeding clinics at hospitals, health departments, or women’s health clinics” (CDC, 2013). Healthcare professionals also offer support through the BFHI and through tools such as the 10 Steps for Breastfeeding Success. The BFHI is:

“a global program sponsored by WHO and UNICEF to encourage and recognize hospitals and birthing centers that offer an optimal level of care for infant feeding. The BFHI helps hospitals give mothers the information, confidence, and skills they need to successfully initiate and continue breastfeeding their babies or to feed formula safely, and it gives special recognition to hospitals that have done so” (CDC, 2013).

The BFHI includes breastfeeding policies like the 10 Steps For Breastfeeding Success. These steps include routine communication to all health care staff regarding evidence based practice, staff training according to policy, informing and helping pregnant and breastfeeding women within 1 hour of birth, showing mothers how to exclusively breastfeed, rooming in, breastfeeding on demand, no artificial nipples, and fostering the establishment of breastfeeding with support group referrals and early discharge from the hospital setting if applicable.

Chapter II: Review of Literature

Implementing Cup Feeding

Over the years, cup feeding has been viewed as an activity meant for toddlers. The American Academy of Pediatrics recommends transition from bottle to cup before 18 months of age to prevent tooth decay (AAP, 2020). Cup feeding is less commonly thought of as a tool for breastfeeding. However, the World Health Organization recommends cup feeding as a tool for infants born premature or who are struggling to breastfeed over other forms of alternatives for breastfeeding (WHO, 2019). UNICEF also endorses cup feeding as a tool for breastfeeding success in low-resource settings (WHO, 2009). Despite research and known benefits of cup feeding on breastfeeding success, there are gaps in research on cup feeding and thus slowed its use in hospital settings in the United States. However, new advancements in cup feeding research may have reintroduced its benefits in breastfeeding success.

The most current cup-feeding device is the Nifty Feeding Cup. An ongoing study by Seattle Children's Hospital and Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana is comparing the use of the Nifty Feeding Cup to a generic medicine cup on 200 infants. This yearlong study is testing the hypothesis that the Nifty Feeding Cup feeding compared to generic cup feeding would result in: (1) less spillage, (2) greater caregiver satisfaction, and (3) shorter duration of feeds (McKinney, Coffey, & Plange-Rhule, 2019, pp. 6). Infants involved in the study include those born prematurely (under 37 weeks), diagnosed with feeding difficulties, have an anticipated hospital stay that is at least 48 hours, or are clinically indicated to start cup feeding (e.g. currently have a nasogastric tube in place). Prior to this study, design tests were conducted in South India.

In these tests, mothers and lactation providers preferred the Nifty Feeding Cup compared to the paladai cup because of less spillage, fewer cuts to the mouth, and its larger size. Researchers predict that the “Nifty Feeding Cup is proposed to improve the feeding experience of the mother-infant pair and will become the standard cup for feeding infants with breastfeeding difficulties in low resource settings” (pp. 6). Final analysis is still pending (McKinney, et al., 2019).

At the national level, there are no current statistics on the use of cup feeding in the United States. However, as described before, cup feeding is a component in the BFHI and therefore should be incorporated into Baby Friendly Hospitals in the United States. As of 2018, there are approximately 500 Baby Friendly Hospitals in the United States (MacEnroe, 2018). Under guideline 9.1 of the revised BFHI Guidelines and Evaluation Criteria for all Baby Friendly Hospitals in the United States, “any fluid supplementation (whether medically indicated or following informed decision of the mother) should be given by tube, syringe, spoon, or cup in preference to an artificial nipple or bottle” to avoid nipple confusion (Baby-Friendly USA, 2020). A bottle is still listed as an adequate feeding tool for infant feeding although BFHI advises against its use. However, a cup can also be used as a tool for supplemental feedings or breastmilk.

On a global level, cup feeding is more common in third world or developing countries. According to Lang, Lawrence, and Orme, “cup feeding is used in several developing countries, not only by mothers who have limited access to hospital facilities but also by pediatric and special care baby units” (1994). Specifically, in these countries, cup feeding is used to increase infants’ body weight and to prevent the use of bottle feeding, “which is known to result in increased infant morbidity and mortality,

particularly where hygiene is a problem, the sterilization of bottles difficult, and gastric tubes not easily available” (Lang, Lawrence & Orme, 1994).

An example of global use of cup feeding can be seen in a study performed in rural Ghana where delay in breastfeeding initiation is common. According to Edmond, et al., (2008), there were strong associations between delayed breastfeeding and neonatal mortality in the study after collecting data on 11,787 low birth weight (LBW) infants attempting to breastfeed. Mothers unable to breastfeed in the study were encouraged to feed by cup as intravenous drips and gastric tubes were not available to improve nutrition or fluid status among the infants in the area. Mothers who were able to breastfeed were encouraged to do so. An infant was considered to be breastfed if breastmilk was a part of any portion of the diet (pp. 439).

Results found that there was “an increasing risk of mortality with increasing delay in initiation of breastfeeding from 1 hour to after day 3 in LBW infants...overall initiation of breastfeeding after day 1 was associated with an almost threefold increased risk of mortality in LBW infants” (pp. 440). Feeding by cup is one clean method that can be used to initiate breastfeeding as soon as possible in infants able to do so. In the section titled ‘feeding practices and birth weight’ it was noted that “there was a 1.7-fold higher risk [of mortality risk] of delayed breastfeeding initiation in LBW than non-LBW infants” (pp. 441). Breastmilk can be delivered by a cup to potentially decrease the risk of mortality in infants in third world countries like rural Ghana. More research is needed to understand the effects of cup feeding in third world countries as it applies to breastfeeding success.

Cup feeding can take place nationally and globally in both the home and hospital setting. In the hospital setting, cup feeding can be used in neonatal specialty units such as the NICU. A study by Olaogun, et al., (2015), reviews cup feeding practices of caregivers in a NICU to analyze the quality of care in caregivers and nurses delivering breastmilk to an infant through cup feeding. A quantitative descriptive design was used to examine cup feeding practice according to a hospital policy in a Baby Friendly Facility. Observation of feeding practices included hand washing technique, positioning of the neonate during the feeding, positing of the cup during feeding, post-feeding newborn assessment by the caregivers, and burping the neonate (pp. 605).

This study was conducted on 45 infants that were more than 30 weeks' gestation at birth and clinically stable. 'Clinically stable' was defined in the study as "having no conditions that would affect feeding, such as respiratory distress or oxygen dependency and any other medical conditions that are capable of affecting cup feeding" (Olaogun et al, 2015). This study was conducted at a Baby Friendly Hospital in the NICU setting in south-west Nigeria. According to Olaogun, et al, "all nurses in the NICU were trained on how to cup feed and are also expected to train all mothers and caregivers that have their baby admitted into the NICU, how to cup feed" (Olaogun et al, 2015).

Data collection instruments included a self-administered structured questionnaire given to mothers of the neonates in the sample and an observation checklist developed from the WHO guidelines on cup feeding. A total of 17 nurses and two pediatricians were observed during the study. Results were as follows: (1) 16.7% performed hand washing accurately, (2) 5.6% gathered all the utensils needed for cup feeding, and (3) 41.7% properly assessed to determine the condition of the new born prior to initiating cup

feeding. Furthermore, approximately half (55.6%) of the providers positioned the neonate correctly during feeding while 30.6% positioned the cup correctly on the neonates lips. In addition, less than half (47.2%) were cautious not to pour the milk into the infants mouth and 44.4% monitored the flow of milk. As burping was also observed, 2.8% burped the infant during the feeding whereas 19.4% burped the infant after the feeding.

Documentation was not done by any of the caregivers (pp. 606).

The majority of caregivers who cup fed the infants in the study were nurses (77.8%). According to the study, “there was a significant difference in the practice of cup feeding between the nurses and other caregivers ($p = 0.035$)” (pp. 605). In the discussion section, researchers found “that nurses had better practice though: there was a general poor practice by all care givers” and “there is a need to retrain nurses and educate mothers on the cup feeding” (Olaogun et al, 2015). Especially in Baby Friendly Hospitals, it is expected that caregivers know and follow the policy of cup feeding.

In the relevance to clinical practice section researchers stated, “failure to follow the guidelines [on how to properly cup feed an infant] would result in negative outcomes that may increase the morbidity and mortality rate...and there is a need for training and retraining” (pp. 608). With any form of infant feeding, if practice guidelines are overlooked or not followed, there are bound to be negative outcomes.

It is important that time is taken to educate caregivers, both nurses and family members, and test competency levels on cup feeding to avoid preventable negative outcomes when cup feeding is used incorrectly. A doctoral dissertation by Ghareeb (2015) examined the impact of cup feeding on multiple variables including knowledge and education of cup feeding by healthcare providers and nurses. Research was

conducted via online questionnaire on 178 participants who had neonatal healthcare experience and/or had a BSN or less. The two categories of the 178 participants were those in the United States (70 participants) and those in Irbid, Jordan (80 participants). The questionnaire included participant demographic, personal beliefs on infant feeding methods (e.g. cups, bottles, NG tubes, and breastfeeding) including education and safety of infant feeding, and practicality of infant feeding methods. The survey also included past experiences with infant feeding methods.

The 'knowledge' section evaluated knowledge regarding premature infant feeding. This included cup feeding. Data from this section was quantified using a 7-point scale (0 = never, 6 = always) regarding knowledge of nursing workload, infant aspiration and fatigue, transition to exclusive breastfeeding, infant respiration and time. 'Cup feeding preference and past behavior' evaluated participant experience and past behavior with cup feeding. Data from this section was quantified using an 8-point scale (1 = never, 9 = daily) for cup feeding frequency and education. Data from this section was also quantified using a 4-point scale (1 = no successful, 5 = extremely successful) for parenteral cup feeding.

According to the study, "Cup feeding knowledge was significantly lower than breast feeding and NGT [nasogastric tube] feeding but not significantly lower than bottle feeding" (pp. 71) as indicated by a mean of 2.89 ($p < 0.001$). In regards to cup feeding preference and past behavior, there was an acceptable amount of results to review. First, the majority of nurses and other healthcare providers (79.8%) had heard of cup feeding. However, only about one third of the participants (38.5%) had used it in practice despite the WHO recommendation to do so in infants struggling to breastfeed, including infants

of low birth weight or prematurity. In addition, Ghareeb found that 61% reported positive parent preference for cup feeding. However, only 50.3% remarked that they would consider it as a method of feeding (pp. 73). In the perspective of the parents, both cup feeding frequency and parent education on cup feeding means were 4.0 and 3.6 respectively. For those who had reported cup feeding as a practice, their success scores were as follows: (1) physician/nurse self-reported mean = 2.93 and (2) parent mean = 2.65 (pp. 73). This shows a slight increase in confidence of caregiver to cup feed an infant over a parent.

In sum, analysis of the data in this study shows a difference in feeding knowledge by occupation type for cup feeding. For cup feeding, physicians had more knowledge than nurses. In regards to past experiences, participants with at least 10 years' experience of neonatal health care indicated a higher frequency of cup feeding practice. Finally, "there were no differences in parent training, parent success, or participant success in cup feeding by experience group" (pp. 89). Regarding the cross-cultural design, cup feeding was also held in a more positive regard in the United States, especially for preterm infant feeding than in Jordan (pp. viii).

It is important to view the perspectives of all who care for infants struggling to breastfeed. Seeing there is a difference in physician and nurse knowledge, it is important to offer educational courses and training sessions to unify the knowledge base on cup feeding. This is especially important for the nursing field as the act of cup feeding is more likely to be seen in nursing care over physician care. The nurse is primarily responsible for direct patient care, and this would include cup feeding and cup feeding

education to parents. If more education is given on the benefits and the act of cup feeding, there may be an increase in its implementation of nursing practice.

As stated in the previous section, there is a gap in knowledge of cup feeding education. In one case study, Thorley (1997) describes an infant who was fully fed breast milk by cup because of attachment issues and breast refusal. The case report describes a 32-day-old baby who was born vaginally with no remarkable issues. At day four of life, the baby had problems attaching to the breast. A nipple shield was advised but was eventually discontinued due to damage to the breast and fears of nipple confusion. After a decrease in birth weight (birth weight of 3630 g to 3410 g at eight days to 3320 g at 20 days), a more extensive implementation was completed. This included the initiation of cup feeding at 16 days with the mothers expressed breastmilk. Formula was only given the night before at day 15.

On day 16, the mother was given a cup and a “tongue stroking technique was recommended to improve suck” which was not successful (pp. 54). A lactation consultant was called in to educate the mother on cup feeding technique. However, the mother’s own cup feeding technique was not observed by the lactation consultant or OBGYN. After nearly two weeks of use, the mother contacted the doctor stating that her baby “closes his eyes and goes to sleep at the breast” and “sometimes cries” (pp. 54). The mother was called in for a consultation to observe her cup feeding technique. When observed it was noted that the baby was too reclined, and milk was being poured into his mouth rather than allowing him to control his intake. As a result of multiple days of this poor technique, “the baby was losing the ability to close his mouth and use his tongue as part of the feeding process” (pp. 55).

An extended period of time passed before the infant was to exclusively breastfeed. This situation could have easily been avoided if the lactation consultant remained with the mother during her first encounter with cup feeding. If proper education was implemented, milk aspiration and the alternations of bottle and cup towards the end of the transition to breast could have also been avoided.

With proper technique, cup feeding an infant struggling to breastfeed can be safe and effective. Marinelli, Burke, and Dodd (2001), reviews the physiological stability of cup feeding and cup feeding safety that may affect premature infant transition to exclusive breastfeeding. This prospective, randomized crossover study analyzed volume intake, time required to complete the feed, apnea, bradycardia, choking, and spitting (Marinelli et al., 2001, p. 350). The purpose of this study was to compare the safety of cup feeding compared to bottle feeding in preterm infants whose mothers intended to breastfeed.

In the study, 56 infants less than or equal to 34 weeks gestation and their mothers who desired to breastfeed were considered eligible for participation. Infants over 34 weeks but under 37 weeks were also considered eligible. Exclusion criteria included premature infants with concurrent diagnoses or conditions that would inhibit oral feeding. Randomization occurred when a baby was at least 34 weeks. Nine NICU nurses were trained to administer breast milk through a 30 mL medicine cup. Infants were swaddled while the tip of the cup rested at their bottom lip. The milk was not poured into the infant's mouth. Bottle feeding consisted of a graduated feeder with a standard yellow nipple. All infants in the study were monitored by Hewlett-Packard Merlin Series

monitors for baseline periods of 10-minute pre-feeds and intra-feeds (Marinelli et al., 2001, p. 351).

Researchers found that changes in baseline vitals were significant for both cup feeds and bottle feeds ($p < 0.0001$). Overall, mean oxygen saturation was higher in cup fed ($\text{SaO}_2 = 90\%$) premature infants than in bottle fed ($\text{SaO}_2 = 74.4\%$) premature infants. There was an increase in volume consumed for bottle fed premature infants than in cup fed premature infants. As expected, cup feeding had a longer duration. The most critical finding was that there was no significant difference in choking, spitting, apnea, or bradycardia episodes. (Marinelli et al., 2001, p. 352). Based on the results, the researchers concluded that cup feeding was a safe practice for feeding a premature infant.

Once safety was established, researchers discussed cup feeding and its benefit to breastfeeding premature infants. In the article, Marinelli, et al. states, during breastfeeding, the infant controls the flow of milk. Bottle feeding has been found to force the flow of milk which forces the baby to swallow. From the researchers perspective, “cup feeding may be more similar to breastfeeding” because, “the infant is in control of his own intake, able to pace his feeding similar to attempts at breast” (Marinelli et al., 2001, p. 353). The small volumes were also discussed in the results. Researchers in this study addressed this by reinforcing the true purpose of breastfeeding, developmentally supportive care. Additionally, “rather than looking at smaller volumes consumed and longer times for cup feeding as a negative effect, when viewed in this light, they are in fact indicative of a feeding method that permits the infant to determine his needs...” (Marinelli et al., 2001, p. 353). Establishing safety with cup feeding will support those

who are interested in cup feeding their premature infant. Though this study focuses on theoretical application of breastfeeding, it stresses the importance of establishing safety so that more individuals can use cup feeding to help their premature infant transition to the breast.

Potential Set Backs

Even though several publications have demonstrated positive associations between cup feeding and breastfeeding success, the literature also reveals that cup feeding can be viewed in a negative light in regards to knowledge and usage (Olaogun, Ghareeb, & Thorley). This is due to the difficulty of cup feeding, education on cup feeding, and unfamiliarity of its design compared to exclusive breastfeeding, tube feeding, and bottle feeding. However, cup feeding is physiologically safe and may have multiple benefits to breastfeeding success as evidenced by the studies in the literature review. It is one role of the nurse to provide all resources known to be beneficial to the struggling infant to increase the infant's chances of breastfeeding successfully.

Conclusion

As stated prior, cup feeding is recommended by the World Health Organization as a tool for infants struggling to breastfeed and is recommended as a tool for infant feeding or supplementation by the BFHI Guidelines and Evaluation Criteria for all Baby Friendly Hospitals in the United States. Though cup feeding is recommended and recognized by many organizations and believed to be a safe and effective way to deliver breastmilk to the infant struggling to breastfeed, there are gaps in education and low levels of competency regarding cup feeding in both caregivers and parents involved in infant care (Olaogun, Ghareeb, Thorley, & Mairnelli). More education is needed in the

area of cup feeding to all who are involved in infant care. This is to ensure that all mothers or those caring for infants struggling to breastfeed have all the tools and education necessary to increase the likelihood of breastfeeding success.

Cup feeding applies to nursing practice to improve patient outcomes. Receiving breastmilk through a cup ensures that infants consume necessary nutrients that promote growth and well-being. Nutrients can include necessary macronutrients needed for weight gain and maturation of underdeveloped organs. Utilization of the cup feeding method may help mothers in their future breastfeeding efforts. According to WHO, “as cups are easier to clean than bottles, cup-feeding could potentially reduce the risk of severe infections such as diarrhoea” (2019c). This is significant because diarrheal disease account for 1 in 9 children deaths worldwide, “making diarrhea the second leading cause of death among children under the age of 5” (CDC, 2019d). By using a cup, there may be a reduction in bacteria exposure from bottles which may reduce the need for healthcare visits related to infections acquired with bottle use.

There are approximately 500 Baby Friendly Hospitals in the United States (Baby Friendly USA, 2018). The philosophy of the BFUSA is as follows: (1) “human milk fed through direct breastfeeding is the optimal way for human infants to be nurtured and nourished”, (2) “the precious first days in the birth facility should be protected as a time of bonding and support not influenced by commercial interests” and (3) “every mother should be informed about the importance of breastfeeding and respected to make her own decision” (pp. 8 – 9).

Cup feeding should be offered to mothers who struggle to breastfeed. The future of cup-feeding is uncertain if formula is used when not all resources have been exhausted

and if other alternative methods of feeding (e.g. feeding tubes, bottles) are continued to be seen as standard breastfeeding support measures in hospitals. Education is needed for healthcare providers so that mothers of infants struggling to breastfeed are offered every method that exists to deliver breastmilk to their baby. Cup-feeding is meant to be used as a short-term tool for a long-term outcome. Every mother-infant pair has the right to informed healthcare decisions as part of evidenced based care nursing.

Chapter III:

Methodology

An application was submitted to the Carroll College Institutional Review Board prior to starting the study. Upon review of the IRB, it was determined this study was exempt from needing a full review. Consent was implied when surveys were completed and returned. The following sections describe the population and sample, design, procedures for data collection, instrumentation, and confidentiality of the study.

Population and Sample

This study was conducted using convenience sampling on mothers (aged 18 or older) who have breastfed in the past 5 years or who are currently breastfeeding. Subjects needed to reside in either Lewis & Clark County, MT or Snohomish County, WA at the time of survey completion. Completed surveys were received by a total of 205 breastfeeding mothers in either Lewis & Clark County, MT or Snohomish County, WA.

Design

To answer the research question, a 25 question survey was created. The survey was available in both online and paper form. Online surveys were created through Google Forms with automatic electronic data collection available to the research team upon completion of the survey. Paper surveys were available to those who did not have access to the electronic survey or to those who preferred paper survey form. The survey was available in both English and Spanish. No Spanish surveys were returned by the end of the data collection period.

Procedures for Data Collection

Data collection occurred between November 2019 and March 2020. Within Lewis & Clark County, MT, a variety of groups were contacted to recruit participants for the study. These groups included lactation consultants through the local community hospital, Women Infants and Children (WIC), local public health home visitation nurses, nonprofit mothers group, and personal contacts of the research team. Contact with these groups was made by the research team, and surveys were then distributed by each group through means such as social media posts, distributing paper surveys, or sharing the link for the survey either through email or social media posts.

Within Snohomish Country, WA, additional groups were contacted to recruit participants for the study. These groups included Spanish Area Coordinators, community services, school bulletins, nonprofit mothers' groups, maternal health nurses, neonatal intensive care nurses and other healthcare professionals. Additional means for recruitment included social media posts, and personal contacts of the research team.

Given the nature of the survey distribution, it is unknown how many subjects were provided the opportunity to complete the survey compared to how many actually completed the survey. Thus, a response rate was unable to be calculated.

Instrumentation

The survey was broken down into multiple categories and was five pages in length. An introduction section stated the current World Health Organization recommendations for cup-feeding and the purpose of the survey. The introduction also included the research question and a definition of cup feeding. It was also made known in the introduction section that the survey was anonymous and estimated to take 10-15

minutes to complete. Each response was anonymous and kept confidential by the research team.

Under the introduction, the survey had four other sections. The first section gathered basic demographic information about the participant. This included county residence, age, race, gender, marital status, household income, and medical insurance. Other sections included pregnancy history and breastfeeding experience. This included current pregnancy status (e.g. “are you currently pregnant?”), pregnancies in the past, and details such as gestational age and living children about those pregnancies. Characteristics in the sections of pregnancy history and breastfeeding experience also included location of childbirth experience, support systems, and personal feelings about breastfeeding support. Methods of delivering breastmilk was also included.

The final section included questions about cup-feeding. The participants were asked if cup-feeding was suggested as a tool to help breastfeeding efforts. Additional questions included if cup-feeding was used as a technique by the participant or if the participant knew someone who has cup-fed their baby. Questions also included education of cup-feeding and interest in learning more about benefits of cup-feeding at the end of the survey.

Confidentiality

The survey was anonymous. Paper surveys were kept in a locked office in a file labeled, “completed surveys.” Paper surveys and online survey will be destroyed after data is analyzed and the project is complete.

Chapter IV:

Results

Completed surveys were received by a total of 205 breastfeeding mothers in either Lewis & Clark County, MT or Snohomish County, WA. Results were organized and analyzed using Microsoft Excel and pivot table technology. For the purposes of brevity, Lewis & Clark County, MT will be abbreviated as L&C and Snohomish County, WA will be abbreviated as SC in this chapter.

The aim of the study was to answer the research question: In breastfeeding mothers residing in Lewis & Clark County, MT compared to Snohomish County, WA has cup-feeding been recommended as an intervention for breastfeeding success? Results indicate that cup feeding has been recommended as an intervention for breastfeeding success. In SC, 14 out of 154 (9.1%) were offered cup feeding. Of those 14 participants, 12 felt confident in their ability to breastfeed (either by 'strongly agree' or 'agree'). Three of these 12 participants had infants who were born prematurely. Furthermore, in SC, nine out of 154 (5.8%) used cup feeding. Of those nine participants, seven felt confident in their ability to breastfeed (either by 'strongly agree' or 'agree'). Two of these seven participants had infants who were born prematurely.

In L&C, six out of 51 (11.8%) were offered cup feeding. Of those six participants, five felt confident in their ability to breastfeed (either by 'strongly agree' or 'agree'). One of these five participants had an infant who was born prematurely. In L&C, four out of 51 (7.8%) used cup feeding. Of those four participants, all felt confident in their ability to breastfeed ('strongly agree'). Two of these four participants had infants who were born prematurely.

As there was a large sample size discrepancy between both counties (154 participants in SC and 51 in L&C), it was found beneficial to review the sample size as a whole with respect to cup feeding. In both counties, 20 out of 205 (9.8%) were offered cup feeding. Of those 20 participants, 17 felt confident in their ability to breastfeed (either by 'strongly agree' or 'agree'). Four of these 17 participants had infants who were born prematurely. In both counties, 13 out of 205 (6.3%) used cup feeding. Of those 13 participants, 11 felt confident in their ability to breastfeed (either by 'strongly agree' or 'agree'). Four of these 11 participants had infants who were premature.

Based on the data collection, other interesting questions or relationships can be extracted from the data. This includes information on demographics, pregnancy history, and breastfeeding experience. Demographic information that was analyzed included race, marital status, and household income and insurance. All participants were over the age of 18. In both SC and L&C, the majority of participants were white females (120 in SC and 50 in L&C). Other participants included those of Asian, African American, Hispanic or Latino, and Native Hawaiian or Other Pacific Islander and can be found under Figure 1. Marital status included married, single, engaged, divorced, and widowed. In SC, the majority of participants were married (92.9%) with a minority who stated they were engaged (1.30%), divorced (1.95%), or single (3.25%). In L&C, 88.2% stated they were single, 1.96% stated they were engaged, and 7.84% did not state their marital status. Household income was also collected. In SC, the majority (59.1%) income was within the range of \$45,000-\$140,000+ and most were privately insured. In L&C, the majority (66.7%) income was within the range of \$45,000-139,000 and most were privately insured. More information on demographics can be found under Figure 1.

Figure 1: Demographic Information – SC and L&C.

SC Demographics – Race/Ethnicity & Marital Status		
Race & Ethnicity:	Current Marital Status:	Count:
Asian	Married (23)	23
Black or African American	Married (2)	2
Hispanic or Latino	Married (3); Divorced (1)	4
Native Hawaiian or Other Pacific Island; American Indian or Alaska Native; Other	Married (3); Single (1)	4
White	Married (111); Engaged (2); Divorced (2); Single (5)	120
Did not state/blank	1	1
Grand Total:	154	154
L&C Demographics – Race/Ethnicity & Marital Status		
Race & Ethnicity:	Current Marital Status:	Count:
White	Married (45); Engaged (1); Single (4); Did not state/blank (1)	51
Grand Total:	51	51

SC Demographics – Age Range and Household Income				
Age Range:	\$140,000+	\$45,000- \$139,000	\$20,000- \$44,999	Under \$20,000
22-25	0	3	1	2
26-29	3	13	0	0
30-33	16	36	1	1
34-37	22	22	1	0
38+	14	16	0	1
Did not state/blank	0	1	0	0
Grand Total:	55	91	3	4
L&C Demographics – Age Range and Household Income				
Age Range:	\$140,000+	\$45,000- \$139,000	\$20,000- \$44,999	Under \$20,000
22-25	0	1	1	3
26-29	0	6	3	0
30-33	0	10	1	1
34-37	5	8	1	0
38+	1	9	0	0
Grand Total:	6	34	6	4

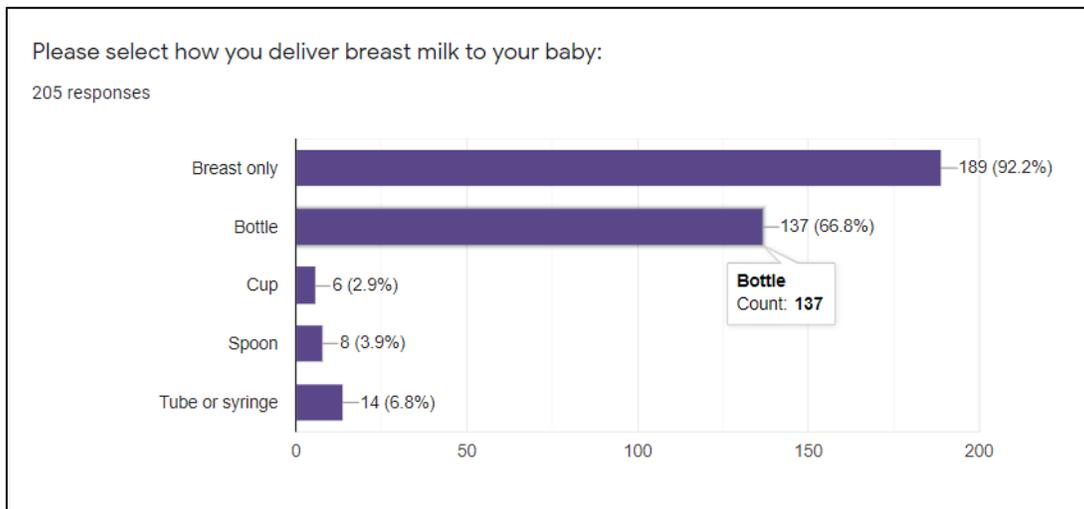
Figure 1 (continued): Demographic Information – SC and L&C.

SC and L&C Demographics – Medical Insurance			
Snohomish County (SC), Washington		Lewis & Clark County (L&C), Montana	
Medicaid	8	Medicaid	6
Privately Insured	145	Privately Insured	44
Uninsured	1	Uninsured	1
Grand Total:	154	Grand Total:	51

Pregnancy history that was included in the data analysis was gravidity, premature births and past feeding methods. In SC, the majority of participants (96.8%) had between 1-5 pregnancies; nine of the respondents were pregnant. In L&C, the majority of participants (70.6%) had between 1-5 pregnancies; eight of the respondents were pregnant. There were 16 recorded premature births in SC and nine recorded premature births in L&C (1 of which was stillborn).

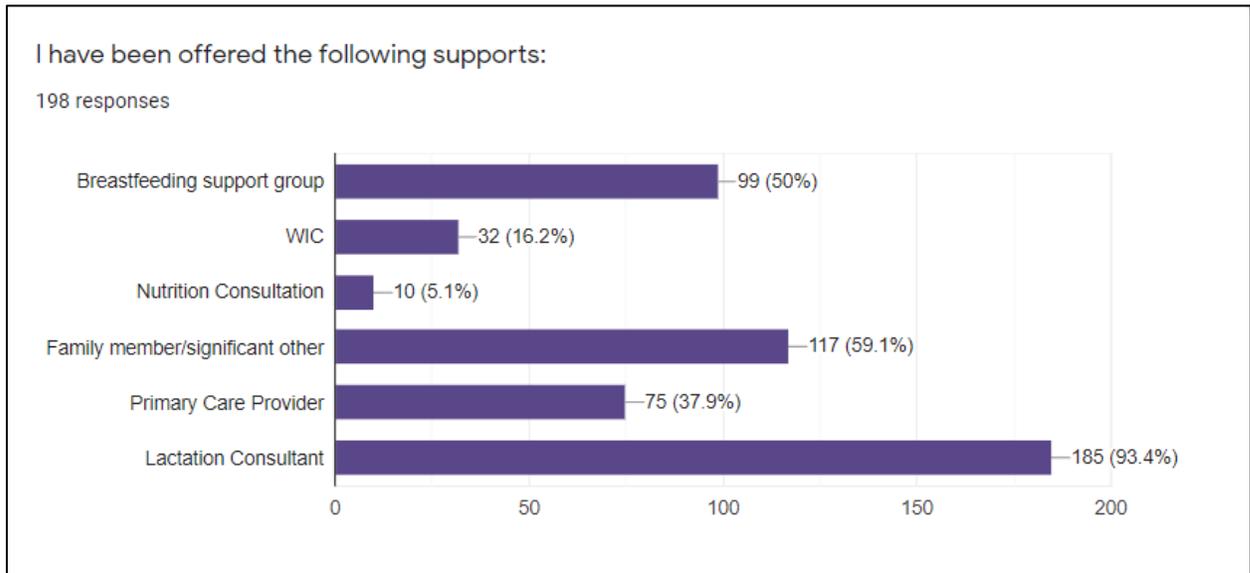
When reviewing past feeding methods, a combination of both bottle and breast were used in both counties. Figure 2 displays a more detailed table of past feeding methods.

Figure 2: Past Feeding Methods – SC and L&C.



Breastfeeding experience included feelings of support related to breastfeeding and resources that were given to support breastfeeding efforts including individuals involved with care of the mother. In SC, 62 out of 154 (40.3%) felt under supported in past breastfeeding efforts (either by ‘strongly agree’ or ‘agree’) and 134 out of 154 (87.0%) felt confident in the ability to breastfeed (either by ‘strongly agree’ or ‘agree’). In L&C, 13 out of 51 (25.5%) felt under supported in past breastetfeeding efforts (either by ‘strongly agree’ or ‘agree’) and 44 out of 51 (86.3%) currently feel confident in the ability to breastfeed (either by ‘strongly agree’ or ‘agree’). In both counties, there were a variety of breastfeeding supports used by the participants. Some of the supports included WIC, lactation consulants, primary care providers, nurses, breastfeeding support groups, and family members/significant others. Figure 3 displays a more detailed chart of supports used by participants regarding their breastfeeding experience.

Figure 3: Support for Breastfeeding Experience – SC and L&C.



Chapter V:

Discussion

Although this study did not statistically analyze the results, there are a multitude of variables that can be reviewed to further understand breastfeeding success and how healthcare providers offer support and assistance to new breastfeeding mothers or mothers struggling to breastfeed. Before addressing other topics of interest in this section, limitations of the study and the answer to the research question will be addressed. Other variables such as pregnancy history, past feeding methods, and breastfeeding experience can also be reviewed to highlight the importance of evidence based practice in the realm of breastfeeding mothers and wellbeing of infants.

Study Limitations

Limitations to this study include a discrepancy in sample size between the two counties and the distribution of the survey. The response rate in Snohomish County, Washington (SC) far exceeded the response in Lewis & Clark County, Montana (L&C). In the area of Snohomish County, Washington, the survey was distributed to a social media platform that was available to over 3,000+ mothers. This greatly impacted the response rate in the county. Agencies in Lewis & Clark County, Montana were less responsive in the acceptance and distribution of the survey due to less communication between platforms in the county and the research team.

Another limitation was flaws in specific survey questions that went unrecognized by the research team until the majority of survey responses had been recorded. Question number two (“select the number of times you have been pregnant”) from the ‘pregnancy history section’ failed to provide the respondent an opportunity to list each individual

pregnancy/child. If each pregnancy/child listed was described in more detail, a more thorough examination could have occurred since it is assumed a mother could have had difficult breastfeeding experiences with different infants.

A final limitation to the study is the demographic homogeneity amongst subjects. The majority of respondents identified as white females in economically stable homes with private insurance. According to Healthy People 2020, “social determinants of health are conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks” (Healthy People, 2020). In terms of examining social determinants of health, this study did not reflect a very diverse group of breastfeeding mothers. Access to healthcare and health education is largely affected by the social determinants of health. The population of breastfeeding mothers and those with low SES are defined as vulnerable populations (Waisel, 2013). It is the role of the nurse to care for such vulnerable populations to ensure healthy living for future generations. More research is needed to see if cup-feeding education and implementation is provided to vulnerable populations, especially those with low SES or who identify as a racial minority.

Answer to Original Research Question

In the sample size and demographic that was available, cup feeding was recommended as an intervention for breastfeeding success. However, because the use of cup feeding was in such miniscule numbers, it is difficult to conclude that it is truly being implemented into practice. In both Snohomish County, Washington and Lewis & Clark County, Montana, the percentages of being offered cup feeding and using cup feeding were both extremely low.

Twenty mothers expressed being offered the method of cup feeding; four of these mothers had infants who were born prematurely. When an infant is born prematurely, more support by the healthcare team is necessary to improve the infant's growth and development. A critical component of support originates from lactation counseling and nutritional support from the interdisciplinary healthcare team. Bottle feeding was heavily used as noted in the results chapter. This may express a problem with breastfeeding amongst the participants that was not commented on in the survey or a personal choice not to breastfeed. If cup feeding was offered as an alternative to bottle feeding in the two counties, confidence in the ability to breastfeed and/or feelings of being supported during breastfeeding efforts may have been higher in both counties, especially in the population of infants that were born prematurely. More research is needed in this area to make definitive conclusions.

The use of cup feeding in both counties was extremely small (13 used cup feeding out of 205) despite the large discrepancy in sample size amongst both counties. This may suggest that cup feeding is rarely recommended as an alternative to breastfeeding when breastfeeding is not immediately possible. If the survey was designed to offer an opportunity to elaborate why or why not cup feeding was recommended or used, a more detailed conclusion could be developed regarding cup feeding use in both counties.

Another result to note regarding the use of cup feeding is that the percentage of being offered cup feeding and the percentage of using cup feeding is slightly different. Reasoning for the difference in percentages is unclear due to insufficient data. More clarity could have been achieved if mothers were given the opportunity to elaborate on experiences of cup feeding education, recommendation, and usage.

Regardless of minimal recommendation and use of cup feeding in both Snohomish County, Washington and Lewis & Clark County, Montana, cup feeding remains available as a tool to deliver expressed breastmilk when breastfeeding is difficult. Minimizing complications (e.g. nipple confusion) and supporting the infant's own ability and gestational age should be the priority of infant feeding when immediate breastfeeding is not possible. Despite the recognition from the World Health Organization as a tool for breastfeeding success in infants struggling to breastfeed, cup feeding remains vastly underutilized and unknown to healthcare providers and therefore the breastfeeding population as a tool that can be used for breastfeeding success. More research is needed to see the quality of education mothers are receiving regarding cup feeding and what recommendation of cup feeding entails.

Other Findings

Other interesting data points included pregnancy history, past feeding methods, and breastfeeding experience. Reasoning for inquiring about pregnancy experience was to acquire a greater understanding of any difficulties in the pregnancy that might have contributed to poor infant feeding. Past feeding methods were collected to observe current alternative feeding methods aside from breastfeeding (e.g. bottle feeding, syringe feeding, spoon feeding, etc.). Data on breastfeeding experience was collected to contribute to the portion of the research question regarding breastfeeding success.

Some participants that did use cup feeding had premature infants and/or felt confident breastfeeding. Though the use of cup feeding to facilitate breastfeeding in a premature infant is appropriate, it was difficult to deeply analyze the significance of this finding. Additionally, it was important to understand if cup feeding was being

recommended to mothers who experienced a premature delivery or who expressed feelings of being under supported in efforts to breastfeed as cup feeding can be especially beneficial to premature infant's success in breastfeeding later in development (Yilmaz, et al., 2014).

Past feeding methods were also collected from the participants. These could include methods such as bottles, spoons, and syringes. As stated in the results chapter, the majority of alternative feeding methods (aside from breast) was the use of a bottle. Whether the use of expressed breastmilk or supplemental formula was used to bottle feed the infant remains unclear. In addition, the reasons caregivers may have for bottle feeding the infant over breastfeeding also is unclear. Bottle feeding can be used for a variety of reasons. Ultimately, the decision to breastfeed versus bottle feed is made by the parents/caregivers. La Leche League recommends breastfeeding for most families however, "newborns may be unable to nurse because of prematurity or immaturity, birth and surgical medications or physical and medical issues" or the mother is uncomfortable with breastfeeding or finds it difficult to incorporate into daily routine (La Leche League, 2020). This is where the importance of support in breastfeeding mothers arises. Whether the mother is unsure of breastfeeding or the infant is struggling to breastfeed, cup feeding can be used as a transitional tool for breastfeeding success.

The Role of Nursing in Breastfeeding Success

To reiterate from chapter one in the introduction section, success in breastfeeding includes continuation of breastfeeding once discharged from a hospital if applicable, adequate suck-swallow-breathe ability once fully transitioned to breast (i.e. exclusive breastfeeding), and long term growth/development for infants struggling to breastfeed

(WHO, 2019). Cup feeding can be a tool to aide in breastfeeding success. Additionally, early introduction of breastmilk through a cup (when feeding from the breast is not immediately possible) provides all of the basic nutrients, enzymes, and antibodies needed to sustain early life. Seeing that cup feeding can be a tool for infants struggling to breastfeed and/or infants who have congenital delays or illness, the delivery of expressed milk through a cup is especially important to support a strong recovery.

Conclusion

Every mother-infant pair has the right to informed healthcare decisions as part of evidenced based care nursing. Breastmilk is the best nutrition a mother can give an infant in its early days of life. Early breastfeeding facilitates physical, mental, and emotional health of both mother and baby. When early breastfeeding is not possible, it can be devastating to family members. Feelings of failure, frustration, and exhaustion can result when there is not adequate support by healthcare providers. Cup feeding over all other forms of alternative feeding in the feeding of infants struggling to breastfeed is not a permanent solution to infant feeding. Rather, it is a stepping stone to early transition to the breast and support of the breastfeeding experience. Nurses are one of the main support systems in the process of this experience.

The role of the nurse in caring for maternal/child populations is vast in its definitions. Specific to breastfeeding, the nurse can act as a lactation counselor. Whether the location is in a postpartum unit, pediatric office, family practice location, home, or a community health resource center, the nurse has the responsibility to offer evidence-based care to the vulnerable populations of women and children. Cup feeding is a safe, acknowledged, evidenced based tool that can be offered to mother-infant couplet

experiencing breastfeeding challenges. The majority of the participants labeled 'nurse' as a support system in their breastfeeding and pregnancy experience. If there are knowledge gaps in the area of maternal/child nursing, such as the use of cup feeding, the time is now to educate and reinforce cup feeding to increase breastfeeding success.

From the words of Florence Nightingale, a nurse should “never lose an opportunity of urging a practical beginning, however small, for it is wonderful how often in such matters the mustard-seed germinates and roots itself.” A 30 ml medicine cup is the practical beginning to breastfeeding success for those that need it. It is the role of the nurse to nurture the simplicity of cup feeding to aid the frustrated mothers and soothe the struggling infant. It is the role of the nurse to close gaps in research to use recommendations like cup feeding and implement them towards populations who need it most.

Appendix A:

English Survey

Introduction:

Whether it is a mother's first infant or an experienced breastfeeding mom, all mothers have the right to be aware of all available resources for breastfeeding to ensure the wellbeing of their baby. The World Health Organization has recommended cup-feeding as one of those resources to be used for infants that are struggling to breastfeed. The purpose of this survey is to answer the question below pertaining to cup-feeding and breastfeeding success:

In breastfeeding mothers residing in Lewis & Clark County, MT compared to Snohomish County, WA has cup-feeding been recommended as an intervention for breastfeeding success?

Basic information and confidentiality:

Cup-feeding is the use of a small cup to feed an infant breastmilk if breastfeeding is delayed or the infant is struggling to breastfeed. An example is shown in the below photographs. Your participation in this **anonymous** survey will help answer the above question regarding the topic of cup-feeding. Your answers to this survey are strictly confidential and will only be shared with members of our research team at Carroll College. This survey is estimated to take 10-15 minutes to complete.

Answers to this survey are strictly confidential and will only be shared with members of our research team at Carroll College. Neither IP nor email addresses will be collected. It is understood that it is not possible to guarantee complete anonymity over the Internet; however, for this study, no one will be able to identify you or your answers. Should the data be published, no individual information will be disclosed.



You are eligible to participate if you:

- Are at least 18 years old of age,
- Reside within either Lewis & Clark County, Montana OR
- Reside within Snohomish County, Washington,
- Are currently breastfeeding or have previously breastfed an infant within the last 5 years,
- Are able to read/write in either English or Spanish

Please answer the following questions to the best of your ability:

Demographic Information:

1. I am a woman residing in (circle below):

Lewis & Clark, County, Montana

Snohomish County, Washington

2. Circle the age group that best describes you:

18-21

22-25

26-29

30-33

34-37

38+

3. I would describe myself as (circle below):

American Indian or Alaska Native

Asian

Black or African American

Hispanic or Latino

Native Hawaiian or Other Pacific Islander

White

4. Circle the gender that best correlates to you:

Female

Gender non-conforming

Other: _____

5. What is your current marital status (circle below)?

Married

Engaged

Divorced

Single

Widowed

6. Circle below what best describes your household income:

Under \$20,000

\$20,000-\$44,999

\$45,000-\$139,999

\$140,000+

7. Circle below what best describes your medical insurance:

Privately insured

Medicaid

Uninsured

Pregnancy History:

1. Are you currently pregnant?

Yes

No

2. Circle the number of times you have been pregnant:

1-5

5-10

10+

3. Indicate in the space below the number of pregnancies you have carried to term (37+ weeks):

Have any of your babies been born prematurely?

Yes No

If yes, state their gestational age(s): _____

4. Indicate in the space below the number of living children you have:

Are you the birth mother for all children listed above?

Yes No

If no, please explain: _____

5. Please circle the location(s) that best describe the place of your previous childbirth experiences (i.e. where you delivered each baby):

Home Birth Hospital Setting Birthing Center En Route to Hospital

6. Please circle the support systems you have received in the past regarding your pregnancy and childbirth experience:

Pediatrician Midwife Nurse Lactation Consultant

Nurse Practitioner Doula Family member/significant other

Physician Assistant Other: _____

Appendix B: Spanish Survey

Introducción:

Tanto si usted es una madre nueva o experimentada, todas las madres tienen el derecho de entender todos los recursos disponibles sobre el amamantamiento para asegurar el bienestar de su bebé. La Organización Mundial de la Salud recomienda la alimentación con taza como una manera para alimentar a un bebé que tiene dificultad con el amamantamiento. El propósito de este sondeo es contestar la cuestión debajo que pertenece al éxito de la alimentación con taza y del amamantamiento:

¿En la población de las madres que viven en el condado de Lewis y Clark, Montana comparado con aquellas que viven en el condado de Snohomish, Washington, ha recomendado la alimentación con taza como una intervención para el éxito del amamantamiento?

Información básica y la confidencialidad:

La alimentación con taza es el uso de una taza pequeña para alimentar un bebe la leche materna si el amamantamiento está atrasado o el bebé está tener dificultad a amamantar. Un ejemplo es mostrado en las fotografías debajo. Su participación en este sondeo **anónimo** va a ayudar a contestar la cuestión encima con relación al tópico de la alimentación con taza. Sus respuestas a este sondeo son exclusivamente confidencial y serán compartidas solamente con los miembros de un equipo de investigación de Carroll College. Es estimado que este sondeo dure 10-15 minutos en completar.



Usted está apto a participar si usted:

- Tiene por lo menos 18 años
- Vive en o el condado de Lewis y Clark, Montana o
- Vive en el condado de Snohomish, Washington
- Está amamantando o ha amamantado en los cinco años pasados
- Tiene la capacidad de leer o escribir en español o inglés

Por favor conteste las siguientes preguntas lo mejor que pueda

Información demográfica:

1. Soy una mujer que vive en (dibuje un círculo alrededor de la respuesta correcta):

El condado de Lewis y Clark, Montana El condado Snohomish, Washington

2. Dibuje un círculo alrededor del grupo de edad que describe a usted:

18-21 22-25 26-29 30-33 34-37 38+

3. Me describiría como... (dibuje un círculo):

Indígena americana o oriunda de Alaska Asiática Negra o afroamericana
Hispana o latina Oriunda de Hawaii o otra isla pacífica Blanca

4. Dibuje un círculo alrededor del género que mejor describe a usted:

Mujer Género disconformista

5. ¿Cuál es su estado civil?

Casada Comprometida Divorciada Soltera Viuda

6. Dibuje un círculo alrededor de la cifra que mejor describe a su ingreso familiar. :

Menos de \$20.000 \$20.000-\$44.999 \$45.000-\$139.000 Más que \$140.000

7. Dibuje un círculo alrededor del tipo de seguro médico que usted tiene:

Seguro médico privado Medicaid No tengo seguro médico

Historia de embarazo:

1. ¿En este momento, está embarazada usted?

Sí No

2. Dibuje un círculo alrededor del número de veces que usted ha estado embarazada:

1-5 5-10 10+

3. Escribe en el espacio abajo el número de los embarazos que usted ha llevado a término (a 37 semanas de la gestación):

¿Sus bebés nacieron prematuramente?

Sí No

Si su respuesta es sí, escriba su/s edad/es de la gestación:

4. Indique en el espacio abajo el número de niños vivos que usted tiene:

¿Usted es la madre biológica de todos los niños enumerados encima?

Sí No

Si su respuesta es no, explica, por favor:

5. Dibuje un círculo alrededor del lugar donde usted parió:

Parto en el hogar El hospital Centro de partos En camino al hospital

6. Dibuje un círculo alrededor de los sistemas de apoyo que usted ha recibido en el pasado con relación a su embarazo:

Pediatra Matrona Enfermera Consultor de lactancia

Enfermera facultativa Comadrona Familia/pareja Médico asociado

Otro: _____

Experiencia del amamantamiento:

1. Yo estoy segura en mi habilidad a amamantar (dibuje un círculo):

Estoy de acuerdo fuertemente Estoy de acuerdo Neutral

No estoy de acuerdo

No estoy de acuerdo fuertemente

2. En el pasado, yo sentía que no tenía apoyo en mis esfuerzos en amamantar (dibuje un círculo):

Estoy de acuerdo fuertemente

Estoy de acuerdo

Neutral

No estoy de acuerdo

No estoy de acuerdo fuertemente

3. Dibuje un círculo alrededor de la manera en que usted le da leche materna a su bebé:

Solo del pecho

Un biberón

Una taza

Una cuchara

4. Mi bebé necesita suplementos adicionales conjuntamente con el amamantamiento (Por ejemplo: fórmula para bebés, productos sin lácteos, vitaminas, medicinas) (dibuje un círculo):

Sí

No

5. Me han ofrecido apoyo de los siguientes grupos (dibuje círculos):

Grupo de apoyo del amamantamiento

WIC

Consulta de nutrición

Un familiar/una pareja

Proveedor de cuidados primarios

Consultora de lactancia

La alimentación con taza:

1. La alimentación con taza ha sido sugerida como una herramienta para ayudar con el amamantamiento:

Sí

No

2. Yo he usado la alimentación con taza con mi bebé:

Sí

No

3. Yo conozco a alguien que alimenta a su bebé con taza:

Sí

No

4. Si yo supiera más sobre los beneficios de la alimentación con taza, yo estaría abierta a alimentar con taza a mi bebé (dibuje un círculo alrededor de su respuesta):

Estoy de acuerdo fuertemente

Estoy de acuerdo

Neutral

No estoy de acuerdo

No estoy de acuerdo fuertemente

5. Estoy interesada en aprender más sobre los beneficios de la alimentación con taza (dibuje un círculo alrededor de su respuesta):

Sí

No

No estoy segura

Appendix C:

Carroll College Institutional Review Board Exemption Letter

Date: September 16, 2019



1601 N. Benton Avenue
Helena MT 59625-0002
406.447.4300 p
406.447.4533 f
www.carroll.edu

Dear Marissa, Katherine, Meredith,

Following the review of your IRB application, it has been determined that the nature of your project, titled "*In breastfeeding mothers residing in Lewis & Clark County, MT compared to Snohomish County, WA has cup feeding been recommended as an intervention for breastfeeding success?*", makes it exempt from IRB . You can proceed with your research.

If you have any questions, please contact me at gschafer@carroll.edu or 406-447-4405.

Good luck with your research!

On behalf of the IRB Committee,

Sincerely,



Gerald Schafer, PhD
IRB Chair
Health Sciences

EC: Stephanie Burkholder, Gerald Schafer, Alan Hansen, Jamie Dolan, Joe Helbling, Stefanie Otto-Hitt, Alexander Street, , Heather Navratil, Andrew Thomas, Russ Bell, Tom Richardson, Starla Blank

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