

Using Telemedicine to Improve Breastfeeding Outcomes in the Primary Care Setting

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Abstract

Breastmilk is the most complete form of nutrition for most infants, and it is recommended that infants are exclusively breastfed for the first six months of life. Nationally, breastfeeding rates fall short of the goals set by the Healthy People 2020 initiative and community-based breastfeeding support programs can lead to an increase in the initiation, duration, and exclusivity of breastfeeding (CDC, 2016). The purpose of this quantitative, pre-test/post-test design Doctorate of Nursing Practice project was to determine if the use of telemedicine technology to provide breastfeeding support would increase breastfeeding duration and exclusivity in mother-infant dyads within a primary care setting. Data collected from the electronic medical record was used to compare breastfeeding duration and exclusivity rates between the pre and post intervention groups. Convenience sampling was used, and participants were established patients within the primary care clinics of a local pediatric primary care clinic. Three mothers attempted to participate in the intervention. Breastfeeding duration and exclusivity rates were found to be similar between the pre- and post-intervention groups. The goal of this project was to provide access to lactation support to a wider range of patients and prevent the barriers associated with attendance of on-site breastfeeding support groups. Providing mothers with resources for successful breastfeeding can lead to increased breastfeeding duration and exclusivity rates, which can further lead to improved health outcomes for both mothers and infants.

Keywords: breastfeeding support, primary care, telemedicine, breastfeeding duration and exclusivity, breastfeeding self-efficacy

Using Telemedicine to Improve Breastfeeding Outcomes in the Primary Care Setting

Breastmilk is the most complete form of nutrition for most infants, and provides benefits for their health, growth, immunity, and development (American Academy of Pediatrics [AAP], 2012; Office of Disease Prevention and Health Promotion, 2016). Breastfed infants are at a lower risk for developing sudden infant death syndrome and respiratory tract, gastrointestinal tract, and ear infections (AAP, 2012). Breastfeeding also provides many positive health outcomes for the mother including decreased amounts of postpartum blood loss, lower risk for postpartum depression, quicker return to pre-pregnancy weight, and decreased risk for breast and ovarian cancer (AAP, 2012; Office of Disease Prevention and Health Promotion, 2016). Evidence suggests that providing breastfeeding support can lead to an increase in the initiation, duration, and exclusivity of breastfeeding (Center for Disease Control and Prevention [CDC], 2016).

Health care providers understand the importance of providing breastmilk to infants; however, a mother's personal experience with breastfeeding can be difficult and exhausting (Phillips, 2011). Participating in breastfeeding support can be beneficial to new mothers and their support partners and can easily be implemented within the primary care setting (Busch, Logan, & Wilkinson, 2014; Corriveau, Drake, Kellams, & Rovnyak, 2013). Pediatric nurse practitioners perform newborn well child exams on a regular basis and these visits provide time to educate and support both mothers and their infants during the first few difficult months of a baby's life (Grawey, Marinelli, & Holmes, 2013). This is the ideal setting to address any breastfeeding issues that a family might be experiencing and to provide encouragement to breastfeeding mothers (AAP, 2012; National Association of Pediatric Nurse Practitioners [NAPNAP], 2013). Further breastfeeding support and reiteration of breastfeeding skill can be offered to mothers through telemedicine technology, without requiring the mother and baby to leave the home for extra support

(Friesen, Hormuth, Petersen, & Babbitt, 2015; Habibi et al., 2012; Rojjanasrirat, Nelson, & Wambach, 2012).

Significance

The American Academy of Pediatrics recommends the exclusive use of breastmilk for the first six months of life, with breastfeeding continuing for at least the first year or longer as desired by either mother or child (AAP, 2012). In 2016, eighty-one percent of babies who were born in the United States received breastmilk of any amount, and of those babies, only 52 percent were still receiving breastmilk at six months of age (CDC, 2016). One of the goals outlined by Healthy People 2020 is to increase the total number of breastfed infants with a target goal of 82 percent of babies having any amount of breastmilk (Office of Disease Prevention and Health Promotion, 2016). Another goal is to increase the number of babies who are breastfed until six months of age to 61 percent nationally (Office of Disease Prevention and Health Promotion, 2016).

While breastfeeding rates in the United States are rising, the country is still falling short of the Healthy People 2020 goals. One approach to achievement of these goals is to provide support to breastfeeding mothers. Breastfeeding mothers perceive early support from health care professionals to be an important aspect of their breastfeeding experience (Phillips, 2011). In addition, mothers who have difficulties with breastfeeding express the feeling of being inadequately prepared to overcome obstacles (Phillips, 2011).

Local Issue

According to the CDC (2016), the number of babies who received breastmilk of any amount in the state of Kansas was 83.8 percent and the number of babies who were still breastfed at six months of age was 50.5 percent. These numbers are just under the goals set by the Healthy People 2020 initiative (Office of Disease Prevention and Health Promotion, 2016). While

breastfeeding rates in Kansas are slowly increasing, there is still room for improvement.

Providing breastfeeding support to breastfeeding mothers and their infants is a way to increase these numbers. In speaking with a physician at a local pediatric primary care clinic, it was found that on-site breastfeeding support groups had been offered twice a month for the last year with little success, and the organization has transitioned to using telemedicine technology to provide remote breastfeeding support to the patient population (Personal communication, June 14, 2017). It is important to provide mothers with the available resources they need to be successful during their breastfeeding journey and breastfeeding support via telemedicine would offer an innovative and improved strategy to fill this gap in our community.

Diversity Considerations

The project site serves a diverse patient population. The primary care clinics at the project site are located in a high need, urban area. Patients served are from a variety of ethnicities and all are welcome to obtain breastfeeding support via telemedicine appointments if desired. As a large portion of the patient population is African American and Hispanic, an important fact to consider is that African American mothers have lower rates of breastfeeding initiation, duration, and exclusivity than Hispanic or Caucasian mothers (Cottrell & Detman, 2013). It has been important at the project site to incorporate aspects of culture and diversity within the appointments to assure that the needs of all participants are met.

Problem and Purpose

Problem Statement

In speaking with a physician at the project site, it was found that an on-site breastfeeding support group had been offered to breastfeeding mothers over the past year, with little success; very few mothers attended this group (Personal communication, June 14, 2017). However, there

was interest from the providers at the site to initiate telemedicine appointments in order to offer breastfeeding support to a wider range of patients, from the comfort of their own homes (Personal communication, June 14, 2017). This evidence-based practice project has implemented the use of telemedicine technology to provide breastfeeding support to mothers within the primary care clinics at the project site.

Purpose Statement

The purpose of this DNP project was to determine if the use of telemedicine technology to provide breastfeeding support would increase breastfeeding duration and exclusivity rates in mother-infant dyads within a primary care setting. Ideally, this project would help to increase the breastfeeding duration and exclusivity rates within our community and the state of Kansas, bringing them closer to the goals that have been set by the Healthy People 2020 initiative. An increase in breastfeeding duration and exclusivity rates will allow more mothers and babies to experience the positive health benefits that breastfeeding and breastmilk can provide.

Facilitators and Barriers

Facilitators

Facilitators for this project included buy-in and support from the providers at the facility and support from the organization. Implementation of this project was feasible, as there was already interest in utilizing telemedicine technology to provide breastfeeding support within the primary care clinics at the chosen project site (Personal communication, June 14, 2017). Many primary care providers have a lack of knowledge of breastfeeding and are ill-prepared to discuss this topic with new mothers (AAP, 2012). Therefore, another facilitator of this project was offering appointments specifically to breastfeeding mothers so they could receive information from a certified lactation

consultant, who is an expert in breastfeeding. This project could be easily sustained during and after the DNP student project with the support and buy-in from the staff within the organization.

Barriers

Barriers for this project included the low-income patient population that was served. Barriers specific to this population included access to the internet or a computer, which was needed to participate in the telemedicine appointments. A final barrier included funding for the project. Although grant money was requested, it was not granted. Lack of financial support required some items to be removed from the project budget. The remaining project cost was covered by the General Pediatrics department at the project site.

Review of the Evidence

PICOTS

The question for this evidence-based practice project follows: In breastfeeding mother-infant dyads, does the use of telemedicine technology to provide breastfeeding support in a pediatric primary care office, compared to the current practice of offering an on-site breastfeeding support group, increase breastfeeding duration and exclusivity rates, over a three-month period?

Search Strategy

To discover the evidence regarding telemedicine and breastfeeding support in the primary care setting, an integrative literature search was performed. Databases searched included Cumulative Index to Nursing and Allied Health (CINAHL), PubMed, Medline, Cochrane Database of Systematic Review (CDSR), and the National Guideline Clearinghouse (NGC). Keywords for this search included telemedicine, telehealth, videoconferencing, breastfeeding support, mother-infant dyad, breastfeeding self-efficacy, breastfeeding duration and exclusivity, and primary care. The search was filtered for English language articles dated January 2010 to June 2017. This search

yielded 449 articles. The titles and abstracts were reviewed, and 75 articles were examined for application to this project. Exclusion criteria included any support group that could not be implemented in a primary care setting and programs that included preterm infants. Studies were included if they took place in a primary care setting and offered support to healthy, full term infants and their mothers.

Twenty articles were included in the literature review that provided evidence to support the implementation of a breastfeeding support group within a primary care setting. An additional five articles were included that specifically provided evidence to support the use of telemedicine or web-based technology to provide breastfeeding support in a primary care setting. These studies and guidelines consisted of an evidence based practice guideline and four systematic reviews of quantitative studies (Level I evidence), three randomized control trials (Level II evidence), nine control trials without randomization (Level III evidence), two systematic reviews of qualitative studies with metanalysis (Level V evidence), five individual qualitative studies (Level VI evidence), and one roundtable discussion from experts in the lactation field (Level VII evidence).

Evidence Subtopics

Five subtopics were found in the literature that can guide health care providers in providing breastfeeding support to breastfeeding mothers. First, evidence has suggested that providing breastfeeding support to breastfeeding mothers and their families can increase the initiation, duration, and exclusivity of breastfeeding (Bonuck et al., 2014; Chung, Raman, Trikalinos, Lau, & Ip, 2008; Cottrell & Detman, 2013; Flannery, 2015; Gallegos, Russell-Bennett, Previte, & Parkinson, 2014; Phillips, 2011). Second, authentic presence from a health care professional during a breastfeeding support group as well as peer support within a breastfeeding support group has been shown to be an effective way to provide support to

breastfeeding mothers (Andaya, Bonuck, Barnett, & Lischewski-Goel, 2012; Busch et al., 2014; Chen, Johnson, & Rosenthal, 2012; Corriveau et al., 2013; Demirtas, 2012; Kaunonen, Hannula, & Tarkka, 2012; MacVicar, Kirkpatrick, Humphrey, & Forbes-McKay, 2015; Nolan et al., 2015; Olson, Haider, Vangjel, Bolton, & Gold, 2010; Schmied, Beake, Sheehan, McCourt, & Dykes, 2011). Third, high levels of maternal self-efficacy are known to have an impact on longer breastfeeding duration and exclusivity (Blyth et al., 2002; Ingram, 2013; Nolan et al., 2015). Fourth, socioeconomic and maternal personality traits also play a role in breastfeeding success and duration (Bosnjak, Grguric, Stanojevic, & Sonicki, 2009; Brown, 2014). Finally, utilizing telemedicine technology to provide breastfeeding support can be an effective method in certain patient populations (Ahmed, Roumani, Szucs, Zhang, & King, 2016; Friesen et al., 2015; Habibi et al., 2012; Macnab, Rojjanasrirat, & Sanders, 2012; Rojjanasrirat et al., 2012).

Effects of Breastfeeding Support on Breastfeeding Duration and Exclusivity

Eight studies suggested that providing breastfeeding support to breastfeeding mothers and their families can increase the initiation, duration, and exclusivity of breastfeeding (Bonuck et al., 2014; Chung et al., 2008; Corriveau et al., 2013; Cottrell & Detman, 2013; Flannery, 2015; Gallegos et al., 2014; Olson et al., 2010; Phillips, 2011). However, each study provided this support in differing ways. In one quantitative study, the usual care was compared to breastfeeding support provided in one of three ways: (a) electronically prompted (EP) anticipatory guidance, (b) lactation consultant (LC) support, and (c) both EP and LC interventions (Bonuck et al., 2014). It was found that the EP and LC group had a three-fold higher intensity and exclusivity rate at three months compared to the usual care (Bonuck et al., 2014). Another quantitative study compared usual care to providing breastfeeding support via a text messaging system and found that exclusivity rates in the intervention group were higher than the control group (Gallegos et al.,

2014). One quasi-experimental quantitative study found that a breastfeeding support group was effective at increasing breastfeeding rates, with the treatment group breastfeeding for about three weeks longer than the control group (Olson et al., 2010). A final quantitative study implemented a “*breastfeeding friendly*” office protocol and found that breastfeeding exclusivity rates were higher after implementation of the protocol (Corriveau et al., 2013). Two qualitative studies interviewed first-time breastfeeding mothers about their experiences and what methods of breastfeeding support helped them to be successful (Cottrell & Detman, 2013; Phillips, 2011). Many mothers that were interviewed described quality breastfeeding support from a health care professional to be important (Cottrell & Detman, 2013; Phillips, 2011).

Finally, two systematic reviews evaluated the impact of breastfeeding interventions. One systematic review provided evidence suggesting that breastfeeding interventions provided to mothers and their families improved both short and long term breastfeeding rates when compared to usual care (Chung et al., 2008). A second systematic review found that the most effective breastfeeding support strategy to meet the needs of low income women is telephone support (Flannery, 2015).

Authentic Presence

Authentic presence from a health care professional has been shown to be an effective approach to provide support to breastfeeding mothers in seven different studies (Andaya et al., 2012; Busch et al., 2014; Chen et al., 2012; Demirtas, 2012; Kaunonen et al., 2012; MacVicar et al., 2015; Nolan et al., 2015; Schmied et al., 2011). One qualitative study interviewed mothers who were participants in a study that utilized electronically prompted (EP) anticipatory guidance and lactation consultants within the primary care office. In the study, most mothers perceived the EP anticipatory guidance provided by the primary care provider to be genuine and perceived the

lactation consultants to be comforting and knowledgeable about breastfeeding (Andaya et al., 2012). Chen et al. (2012) found that longer breastfeeding duration occurred with breastfeeding classes and support groups. Another qualitative study explored the experiences of mothers attending breastfeeding support groups and found that mothers perceived many facilitators to breastfeeding within the group including support from lactation consultants and the ability to weigh their baby during the meeting (Nolan et al., 2015).

Two systematic reviews of both quantitative and qualitative studies found that health care providers can provide authentic and effective breastfeeding support through collaboration with the community and family members and building confidence in the mother (Demirtas, 2012). In addition, both professional and peer support in combination can be an effective method to encourage the continuation of breastfeeding (Kaunonen et al., 2012). Two systematic reviews of qualitative data found that a person centered approach is perceived better by breastfeeding mothers (MacVicar et al., 2015), and a facilitative approach is more effective than a reductionist approach when providing education and support to breastfeeding mothers (Schmied et al., 2011).

Maternal Self-Efficacy

Three studies found that high levels of maternal self-efficacy are known to have an impact on longer breastfeeding duration and exclusivity (Blyth et al., 2002; Ingram, 2013; Nolan et al., 2015). One study applied the breastfeeding self-efficacy theory and found that maternal breastfeeding self-efficacy has a positive direct relationship to increased breastfeeding duration (Blyth et al., 2002). Another mixed methods study found that mothers who were breastfeeding a second or subsequent child had higher self-efficacy scores than first time breastfeeding mothers, suggesting that confidence in breastfeeding and increased maternal self-efficacy can lead to longer exclusivity and duration of breastfeeding (Ingram, 2013). One qualitative study identified

that some mothers expressed the attendance of a breastfeeding support group gave them more confidence in their breastfeeding skill (Nolan et al., 2015).

Socioeconomic Factors and Maternal Personality Traits

Two studies were found that described how different socioeconomic factors and maternal personality traits can effect breastfeeding (Bosnjak et al., 2009; Brown, 2014). While these studies do not provide evidence regarding the specific PICOTS question, they address topics that may help guide breastfeeding education specific to the potential patient population for the project. Brown (2014) found that mothers who are more extroverted, emotionally stable, and conscientious of their health were more likely to initiate breastfeeding and continue for a longer duration. Bosnjak et al. (2009) found that women were more likely to breastfeed if the decision to breastfeed was made prenatally, the maternal intention to breastfeed was for greater than six months in length, the mother was a non-smoker, and the household had a higher income.

Use of Telemedicine Technology to Provide Breastfeeding Support

Five articles were found that provided additional evidence to support the use of telemedicine or web-based technology to provide breastfeeding support. One quantitative study utilized a web-based, interactive, breastfeeding monitoring system to provide support to breastfeeding mothers (Ahmed et al., 2016). In this study, the mothers would enter their breastfeeding data and any difficulties or problems they were experiencing into the system; the program would send notifications to the provider about any breastfeeding problems that were reported (Ahmed et al., 2016). The intervention in this study had a significant effect on improving breastfeeding duration and exclusivity (Ahmed et al., 2016).

One qualitative study integrated videoconferencing breastfeeding support sessions into the mother's routine primary care setting; sessions were offered to the mother both pre- and

postnatally (Friesen et al., 2015). Through this study, it was found that videoconferencing sessions allowed breastfeeding mothers to receive timely, expert, and accurate breastfeeding education and support, while also saving time and travel expenses (Friesen et al., 2015). A second qualitative study explored the maternal experience of utilizing videoconferencing breastfeeding support and found that most mothers found these sessions to be convenient and time saving, while also feeling that they receive the same level of support that they would have received in a face-to-face session (Habibi et al., 2012).

One pilot study of home-based videoconferencing found that mothers were satisfied with the teleconference support and most mothers reported that the video sessions were similar to in-person sessions (Rojjanasrirat et al., 2012). In a roundtable discussion of a panel of lactation consultants who are experienced in using telehealth technology, it was reported that mothers perceive the videoconference method to be similar to in-person breastfeeding support sessions and the providers still feel like they can still encourage confidence in a breastfeeding mother using this technology (Macnab et al., 2012).

Theory

The theory that was applied to this project is self-efficacy theory, which is based on Bandura's social learning theory (Bandura, 1977; Dennis, 1999). This theory describes self-efficacy as how an individual perceives their ability to perform a specific task (Dennis, 1999). When a person is maintaining a certain behavior, they consider four sources of information including personal experiences, observed experiences, verbal encouragement, and emotional experiences (Dennis, 1999, p. 196). These sources of information can easily be applied to breastfeeding. First, a person's prior personal experiences with breastfeeding, whether successful or not, fall into the category of performance accomplishments (Dennis, 1999). If a person has

successfully breastfed in the past, they will have increased self-efficacy in that skill. Second, in the absence of previous experience, a person can become motivated to breastfeed through vicarious experience; simply by observing a friend or family member successfully breastfeed (Dennis, 1999). Third, healthcare providers can offer verbal persuasion, or appraisal, to a breastfeeding mother, which will lead to increased self-efficacy (Dennis, 1999). Finally, individuals make decisions about their ability to perform a skill based on the emotions experienced when completing a task. For example, a mother who feels relaxed and calm when breastfeeding her child will have higher self-efficacy than a mother who experiences pain and discomfort while breastfeeding (Dennis, 1999).

Two studies found during the literature review applied self-efficacy theory and utilized the breastfeeding self-efficacy scale as the measurement tool (Blyth et al., 2002; Ingram, 2013). A diagram of this theory and application to this project represents the theoretical foundation of this project (see Appendix E).

Methods

IRB Approval

Institutional review board approval was granted through the IRB at the project site in December 2017 (see Appendix J). Site approval for project implementation was achieved from leaders at the project site. Pre- and post-intervention data was collected through retrospective chart review of breastfeeding duration and exclusivity rates. Maternal participation in the telemedicine appointments was voluntary and participants made the autonomous decision to schedule each telemedicine appointment. There was minimal risk to human subjects in this project; however, infants and children are considered a vulnerable population, and extra care was

taken to protect their privacy. The student researcher had no conflict of interest and was not employed at this project site.

Ethical considerations. Several ethical considerations were applied to this project. First, attendance of the breastfeeding support telemedicine appointments had many benefits, including providing education and support to breastfeeding mothers. Equality was achieved by welcoming participants from any ethnic background. The participants had an autonomous choice of whether to schedule an appointment or not, and participation was not forced or required. All participants implied consent by voluntarily scheduling their appointments. Privacy and confidentiality was maintained, and data was non-identifiable. However, the data was collected from the electronic health record, allowing for a very minor risk of breach in confidentiality. This risk was managed by limiting access of the collected data and storing the data in a secure file.

Funding. One possible option for funding of this project was through the National Association of Pediatric Nurse Practitioners (NAPNAP). Each year, this organization offers scholarships to doctorate nursing students to utilize for their final projects. Grant money was sought for this project through this avenue but was not granted. Some items were removed from the budget and the remaining cost was covered by the General Pediatrics department at the project site (see Appendix A).

Setting and Participants

The setting for this evidence-based practice project was a local pediatric primary care clinic. This clinic is associated with a major pediatric hospital in the Kansas City metropolitan area. Their mission is to improve the health of children by focusing on family-centered health care (Project Site, 2017). Their vision is to be a leader in advancing pediatric health while delivering exceptional health outcomes (Project Site, 2017). The patient population served

includes a variety of ages and races and they provide both inpatient and outpatient services (Project Site, 2017).

Convenience sampling was used in this project, as the participant sample was selected from the established patient population within the primary care clinics who volunteered to participate in the telemedicine breastfeeding support appointments. The goal participant number for this project was 30 breastfeeding mother-infant dyads. Participant inclusion criteria was a breastfeeding mother with a full-term, healthy infant. Participant exclusion criteria an infant that was born preterm or had chronic medical issues.

EBP Intervention

The intervention for this project was the utilization of telemedicine technology to provide breastfeeding support appointments to breastfeeding mother-infant dyads. Recruitment for participants occurred in three ways: (a) education of the primary care providers within the primary care clinics regarding the project details and encouragement of those providers to offer telemedicine appointments to their current breastfeeding patients, (b) educational handouts about the availability of the telemedicine appointments given to all new patients of newborns and to parents of all infant well child checks, and (c) informational fliers hung throughout the waiting rooms of the primary care clinics.

The telemedicine breastfeeding support appointments were offered two days per week, after regularly scheduled clinic appointments. There were three lactation certified providers within the clinics: one physician and two nurses. Each lactation certified provider offered 1-2 openings per day for telemedicine appointments. The goal of these telemedicine appointments was to provide breastfeeding support to mothers who may have otherwise not been able to receive it due to transportation or financial reasons. In addition, these appointments allowed the

provider to reach a wider client base and improved access to lactation care for the patient population that was served by this clinic (see Appendix G; Appendix H; Appendix I).

Change Process Model

Kotter and Cohen's Model of Change was used as the change process model for this project. This model of change is based on the idea that people change their behavior more when the facts influence their emotions and feelings (Appelbaum, Habashy, Malo, & Shafiq, 2012; Melnyk & Fineout-Overholt, 2015). The model starts with creating a sense of urgency and moves on to obtaining buy-in; it finishes with creating short term wins and making the change stick (Appelbaum et al., 2012; Melnyk & Fineout-Overholt, 2015). This model was chosen for this project, because breastfeeding can be a very emotional experience and the team that worked on creating this change in the primary care setting used those emotional experiences to obtain buy-in from key players and achieve short term wins. This model also combines methods of quality improvement, team work, and evidence based practice, which were all integral parts to the implementation of this project (Melnyk & Fineout-Overholt, 2015). With application of this change process model and support and buy-in from the providers within the institution, this project could continue to be sustained after the completion of the DNP student project.

EBP Model

The evidence-based practice model chosen for this project was Rosswurm and Larabee's model for evidence-based practice change (1999). This model provides a clear and concise six step process for implementing an evidence based practice change that aligns with this evidence based practice project (Rosswurm & Larrabee, 1999). This model starts with assessing the need for practice change, moves on to synthesizing the current evidence, and ends with designing,

implementing, and maintaining the change (Rosswurm & Larrabee, 1999); these steps were followed in the design of this project.

Study Design

The project study design utilized a pre-test/post-test design. Currently, all mothers of infants who receive well child care at this office are asked questions about the way their child is fed. Their answers are entered into the well child exam note and saved in their electronic medical record. This data was retrospectively collected, after IRB approval, for a three-month time period prior to implementation of the telemedicine appointments. This provided baseline data describing the breastfeeding duration and exclusivity rates during the timeframe when the on-site breastfeeding support groups were offered at the project site. After the telemedicine technology was implemented, recruitment of participants occurred, and telemedicine appointments were offered to all breastfeeding mothers. At the end of the three-month period in which the telemedicine breastfeeding support appointments were offered, post-intervention data was collected from the electronic medical records.

Validity

Threats to internal validity included concern that only mothers who were already motivated and committed to breastfeeding would schedule the telemedicine appointments, creating a sample bias. Other factors that influence duration and exclusivity rates included information provided by the primary care provider and support or lack of support within the home. Regarding external validity, there was concern for low sample size, since the breastfeeding support appointments are optional. Low sample size would decrease generalizability of the project.

Outcomes to be Measured & Measurement Instruments

The measured outcomes for this project primarily included breastfeeding duration and exclusivity rates. This data was collected retrospectively as pre-intervention data. Data was also collected prospectively as post-intervention data. All data was collected from the electronic medical record.

Quality of Data

The anticipated number of participants for this breastfeeding support group was 30 participants; therefore, power was not calculated for this small sample size. Demographic information was collected from all participants and included age, race, previous breastfeeding experience, and number of children. Pre-intervention and post-intervention data included self-report of current breastfeeding duration and exclusivity and was collected from the electronic medical record.

Analysis Plan

Descriptive statistics were used for the demographic data to describe the participant sample in the mothers that attempted to schedule a telemedicine appointment, as well as in the overall pre- and post-intervention groups. Breastfeeding duration rates were divided into categories of time: 0-2 weeks, 2 weeks-1 month, 2 months-3 months, 4 months-6 months, and >6 months. Breastfeeding exclusivity rates were divided into 3 categories: breastmilk only, breastmilk with formula supplementation, and formula only. Descriptive statistics were performed on these breastfeeding rates to obtain frequencies. A Wilcoxon signed-ranks test was used to compare breastfeeding duration and exclusivity data between the pre- and post-intervention groups (see Appendix K; Appendix L).

Results

Settings & Participants

This project took place within the primary care clinics at a local pediatric facility. The project intervention was offered from February 2018 through April 2018. Each of the three lactation certified providers offered 1-2 telemedicine appointments, 2 days per week during this timeframe. Three mothers scheduled telemedicine appointments for breastfeeding support during the project intervention. The mean maternal age of the participants was 31 years. All three mothers were Hispanic, multiparous, and had previous experience with breastfeeding.

Intervention Course

Project implementation was initially scheduled to begin January 1, 2018; however, the organization switched telemedicine companies from WebEx to Polycom. This switch required extra installation and training time that was not anticipated within the project timeline. The implementation date was subsequently moved back to February 1, 2018, resulting in three scheduled telemedicine appointments. However, these appointments were not able to be completed due to lack of technology on the participant end. With the switch to Polycom, the clinic was only able to conduct these appointments via a home computer or a tablet. None of the participants had a home computer. One mother had access to a tablet, but it was her daughter's tablet from school, and it was not available during the appointment time.

Outcomes

Given the small sample size ($N=3$) of mothers who attempted to participate in the telemedicine intervention of this project, descriptive statistics was used to analyze the overall, general breastfeeding duration and exclusivity rates from two separate time periods. First, the pre-intervention group consisted of all mother-infant (less than 6 months of age) dyads that were

seen at the project site during a three-month period in which the on-site breastfeeding support group was offered. Then, a post-intervention group consisted of all mother-infant (less than six months of age) dyads that were seen at the project site during a three-month period in which the telemedicine breastfeeding support intervention was offered. Members in each group were not direct participants in either the on-site breastfeeding support group or the telemedicine intervention, they were just seen at the project site during the time when each type of support was offered as an option to patients. These overall breastfeeding rates were analyzed for this project due to the small sample size of the participants and the inability to successfully complete a telemedicine appointment. Data was collected from the electronic medical record of these patients and was entered into SPSS for statistical analysis.

Pre-intervention data. Breastfeeding duration and exclusivity rates were collected retrospectively during February, March, and April 2017 when the on-site breastfeeding support groups were offered. During this timeframe, 22 mother-infant dyads were seen at this project site. Most mothers were African American (45.5%). The rest of the group consisted of Hispanic mothers (18.2%), Caucasian mothers (13.6%), and Asian mothers (9.1%). There were some mothers who did not report their race, or it was not documented (13.6%). Breastfeeding duration during this timeframe consisted of mothers who breastfed for 0-2 weeks (27.3%), 2 weeks-1 month (13.6%), 2 months-3 months (18.2%), 4 months-6 months (13.6%), and greater than 6 months (27.3%). Choice of exclusivity was most likely to be breastfeeding with formula supplementation (45.5%), followed by breastfeeding only (31.8%) and formula only (22.7%).

Post-intervention data. Breastfeeding duration and exclusivity rates were collected for a three-month time period during February, March, and April 2018, during which the telemedicine intervention was offered. During this timeframe, 35 mother-infant dyads were seen at this project

site, 3 of them choosing to directly participate in the telemedicine intervention. Most of the mothers were Hispanic (48.6%). The rest of the group consisted of African American mothers (22.9%), Caucasian mothers (14.3%), and Asian mothers (5.7%). There were some mothers who did not report their race, or it was not documented (8.6%). Breastfeeding duration during this timeframe consisted of mothers who breastfed for 0-2 weeks (8.6%), 2 weeks-1 month (28.6%), 2 months-3 months (20%), 4 months-6 months (40%), and greater than 6 months (2.9%). Choice of exclusivity was most likely to be breastfeeding with formula supplementation (51.4%), followed by breastfeeding only (40%), and formula only (8.6%).

Comparison of pre- and post-intervention groups. Breastfeeding duration and exclusivity rates for both the pre- and post-intervention time periods were collected and entered into the SPSS software. A Wilcoxon signed-ranks test was performed on the data, using a significance level of 0.05. When comparing breastfeeding duration between the pre- and post-intervention time periods, no statistically significant difference was found ($p = 0.318$). The same test was performed on the data comparing breastfeeding exclusivity between the pre- and post-intervention time periods, showing no statistically significant difference between the groups ($p = 0.308$). With this statistical data, we can accept the null hypothesis that the median differences between the pre- and post-intervention time periods were equal.

Discussion

Successes

There were some successes to this project. The most important success was that most babies at this project site, in both the pre-intervention and post-intervention time periods, were receiving some amount of breastmilk at any given time, whether it was breastfeeding only or breastfeeding with formula supplementation. This success has been possible due to the ample

amount of breastfeeding support from the providers at this site. Despite the low number of participants in the intervention, mothers were still able to follow up in the office regarding any breastfeeding concerns they had. They were able to schedule appointments with a lactation certified provider, ensuring they were getting accurate and timely information and education. There was also willingness from all providers to reach out and support their breastfeeding patients. When mothers feel supported with breastfeeding, they are more likely to provide breastmilk longer and more exclusively throughout infancy (Bonuck et al., 2014; Olson et al., 2010).

Study Strengths

One strength of this project was the amount of support present from leadership at the clinic. There was support from the physician director, the preceptor for the project, all the lactation certified providers, and some of the nurses. This amount of support made some of the obstacles faced much easier to overcome. Everyone involved in the project was eager and willing to work harder to make the project successful. Despite the small number of participants, there will still be continued work on this project even after the student component has been completed. The project preceptor will continue to offer the telemedicine appointments and collect data on breastfeeding duration and exclusivity rates at the project site.

Results Compared to Evidence in Literature

Several studies from the literature search performed for this project found that providing breastfeeding support to breastfeeding mothers significantly increased breastfeeding duration and exclusivity when compared to usual care (Bonuck et al., 2014; Chung et al., 2008; Corriveau et al., 2013; Cottrell & Detman, 2013; Flannery, 2015; Gallegos et al., 2014; Olson et al., 2010; Phillips, 2011). The breastfeeding duration and exclusivity rates during our project were similar

between pre- and post-intervention time periods, with slightly higher rates among the post-intervention group, but with no statistical significance. However, in this project, we compared two different types of breastfeeding support, on-site breastfeeding support groups and telemedicine lactation support. It was thought that because we did not compare breastfeeding duration and exclusivity rates to a time when there was no lactation support provided, that this was the reason that our breastfeeding rates were similar between the pre- and post-intervention time periods. Studies from the literature search that supported the telemedicine intervention were often testing for feasibility of the intervention or were qualitative in nature, studying the mothers experience during the intervention (Friesen et al., 2015; Habibi et al., 2012; Rojjanasrirat et al., 2012). Because we did not study these factors in this project, our data cannot be compared to the data found in these studies.

Limitations

Internal Validity Effects

There were several factors affecting internal validity of this project. Even though there was access to the appropriate technology on the clinical end, there was an extreme lack of technology on the participant end. None of the mothers who scheduled a telemedicine appointment had access to the necessary technology. Because there were no successful telemedicine appointments, there was also a lack of data to support the project PICOTS question. The successes of the project came from breastfeeding support offered in other ways, including having the ability to follow up in clinic with a lactation certified provider.

External Validity Effects

One factor that affected the generalizability of this project was the small sample size. Also, all the participants were Hispanic, which may be the minority population at other primary

care locations. Another possible factor affecting generalizability was the setting of the project because the clinic is located in a low-income, urban area and primarily serves the Medicaid population.

Sustainability

During the implementation phase of this project, there were obstacles that were not anticipated. Originally, the implementation phase was planned to last six months, but was shortened to three months due to unforeseen circumstances including prolonged IRB approval time and the unexpected change in telemedicine companies within the organization. Because of the shortened timeline, many of the providers at the clinic felt that the project was just getting started and gaining strength. The intervention will continue to be offered after completion of the student project and initial data collection. There is potential for improvement as the project progresses. Some ideas from the team included searching for further funding to provide the clinic with tablets that could be checked out to families to use for the telemedicine appointments. Another option was to explore a telemedicine technology that is compatible with use on a cell phone which would broaden the options for participants.

Efforts to Minimize the Study Limitations

The telemedicine intervention was offered to all breastfeeding mothers at the project site, which was an attempt to minimize limitations regarding participation. One of the major limitations to this project was the lack of technology. In the early planning stages of this project development, the study team was informed that appointments would be able to be executed with the use of a cell phone. However, with the switch in telemedicine technology companies, the use of a cell phone was no longer an option, leading to the huge limitation in lack of technology. Moving forward, the study team plans to explore other telemedicine technology companies or

obtaining grant money to purchase tablets that can be temporarily used by families during the intervention.

Interpretation

Expected & Actual Outcomes

When looking at current literature related to telemedicine and breastfeeding support, it was expected that this intervention would have a positive impact on increasing breastfeeding duration and exclusivity rates at this clinic. What we actually found was that breastfeeding duration and exclusivity rates were similar, with slightly higher rates among the post-intervention time period when compared to the pre-intervention time period. Statistical analysis of the data showed no significant difference in breastfeeding duration or exclusivity rates between the pre- and post-intervention time periods. In addition, with only 3 mothers attempting to participate in the telemedicine intervention, but not able to successfully complete the appointment, there is not enough valid statistically significant data to suggest that the telemedicine intervention caused any change in breastfeeding rates. One possible reason for the similar breastfeeding rates between the two groups could be that both time frames that we collected data from were during times when some sort of breastfeeding support was offered versus collecting data from a time when no breastfeeding support was offered.

Other unexpected problems during this project included the sample size, time frame, and issues with technology. The project team did anticipate a small sample size with an expected goal of 30 participants within a six-month time frame. We did not expect a sample size of three participants nor did we expect to have a shortened time frame of three months. The biggest unexpected obstacle was the issues with technology that were experienced during this project.

Intervention Effectiveness

The intervention did not go as planned or expected. There were only three mothers who scheduled a telemedicine breastfeeding appointment, and none of the appointments were able to be completed due to lack of technology. The overall breastfeeding duration and exclusivity rates were similar between the pre- and post- intervention time periods. The pre-intervention group consisted of a group of mother-infant dyads that were seen at the project site during the time when the on-site breastfeeding support group was offered to patients. The post intervention group consisted of a group of mother-infant dyads that were seen at the project site during the time that the telemedicine intervention was offered to patients. These mother-infant dyads were not direct participants in either intervention. Only 3 mothers in the post-intervention group chose to participate in the telemedicine intervention but were unable to complete the telemedicine appointment; therefore, there is not enough data to suggest that the telemedicine intervention had any effect on breastfeeding rates. It may have been more helpful to compare this data with another group of mother-infant dyads that were seen at the project site during a time when there was no breastfeeding support offered to clients.

Another factor that played a role in the effectiveness of the intervention was that this site was in an urban area, serving a primarily low income, Medicaid population. This patient population historically has had issues with financial and transportation barriers. The small sample size and the lack of access to technology could be due in part to the patient population that is served at this project site. This project might have better outcomes in a more developed location with a patient population that has better access to technology.

Intervention Revision

Intervention revision includes searching for further funding to provide the clinic with tablets that could be checked out to families to use for the telemedicine appointments. Another option is to find a telemedicine technology that is compatible with use on a cell phone which would broaden the options for participants. These two ideas could be utilized to strengthen the intervention and potentially yield the original expected results.

Expected & Actual Impact to Healthcare System

Expected impacts to the healthcare system related to this project included increased breastfeeding duration and exclusivity rates, as well as the multiple health benefits that breastfeeding and breastmilk can provide. With the limited data collected and the low number of participants, there is not enough valid statistically significant data to come to a conclusion regarding the impact of this project on the healthcare system. It is possible that with an increased timeline and further data collection that a conclusion could eventually be drawn. There was, however, limited cost impact associated with this project. The clinic already had the technology necessary to implement this project so there was no cost associated with webcams as initially planned. The lactation certified providers were not working any additional hours to complete these appointments; therefore, no additional cost was imposed upon the clinic due to lactation consultant salary. The only real cost associated with this project was related to printing and advertisement needs. Due to the low cost associated with this project, sustainability related to cost should not be limited. The project was funded through the General Pediatrics department at the project site. However, if additional needs develop to improve the intervention, additional funding should be sought.

Conclusions

Further Study of the Intervention

Although the implementation of this evidence-based practice project did not go as planned, continued efforts to improve the intervention could help increase breastfeeding duration and exclusivity rates within this primary care setting. Because the biggest obstacle was ensuring that participants had the appropriate technology to conduct the telemedicine appointments, future funding could be sought to purchase several tablets that could be checked out to families that do not have access to one at home. Another consideration would be to use a program that would be compatible with use on a cell phone. With additional time and effort, improvements could be made to this project to make it feasible in this setting and with this population.

Dissemination

This project has been presented in various settings. The project proposal poster was presented at the annual National Association of Pediatric Nurse Practitioners (NAPNAP) conference in March 2018. The final project results were presented informally to the project preceptor.

Practical Usefulness of the Intervention

It is known that breastmilk is the most complete form of nutrition for most infants, and it is recommended that infants be exclusively breastfed for the first six months of life (AAP, 2012; Office of Disease Prevention and Health Promotion, 2016). However, breastfeeding rates continue to fall short of the goals set by the Healthy People 2020 initiative (CDC, 2016; Office of Disease Prevention and Health Promotion, 2016). Evidence suggests that breastfeeding support programs can lead to an increase in the initiation, duration, and exclusivity of breastfeeding (CDC, 2016). In addition, using telemedicine to provide that support can be an

effective option in some settings (Ahmed et al., 2016; Friesen et al., 2015; Habibi et al., 2012; Rojjanasrirat et al., 2012). As healthcare providers, it is important to encourage and support breastfeeding mothers and their families. Providing mothers with resources for successful breastfeeding and helping them feel supported, no matter what type of support is offered, can lead to increased breastfeeding duration and exclusivity rates. Longer exclusive breastfeeding time can further lead to improved health outcomes for both mothers and their infants.

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Appendix A

Cost Table

Telemedicine Breastfeeding Support

Salaries/Wages	Monthly	Total
Lactation Consultants:		
1 hour x 3 days/week x 3 months	$\$30/\text{hour} \times 2/\text{days} = \$60/\text{wk} \times 4 \text{ wk} = \$240/\text{mo} \times 3 \text{ months} = \720	720
Lactation Consultant #2		720
Lactation Consultant #3		720
Total Salary Costs		2160
Startup Costs: Item	Cost	Total
Paper for handouts		20 20
Advertising costs		20 20
Printer Ink		100 100
Total Startup Costs		140
Operational Costs	Cost	Total
Other indirect costs	10% of total project	629
Total Operational Costs		629
Total Project Expenses		2929

Appendix B

Definition of Terms

Breastfeeding duration: the length of time a person breastfeeds

Breastfeeding exclusivity: providing only breastmilk to a baby without the use of formula or other supplemental foods

Breastfeeding self-efficacy: a mother's perceived confidence in performing the skill of breastfeeding

Breastfeeding support: breastfeeding education and counseling provided to breastfeeding mothers by a lactation consultant

Mother-infant dyad: a breastfeeding mother and her baby

Telemedicine: utilization of web-based video conference technology to provide healthcare appointments remotely, with the provider in the clinic and the patient at home

Appendix C
Synthesis of Evidence Table

PICOTS: In breastfeeding mother-infant dyads, does the use of telemedicine technology to provide breastfeeding support in a pediatric primary care office, compared to offering an on-site breastfeeding support group, increase breastfeeding duration and exclusivity rates, over a three-month period?

First author, Year, Title, Journal	Purpose	Research Design, Evidence Level & Variables	Sample & Sampling, Setting	Measures & Reliability (if reported)	Results & Analysis Used	Limitations & Usefulness
Effects of Breastfeeding Support on Breastfeeding Duration and Exclusivity						
1) Flannery (2015). Increasing breastfeeding rates: Evidence-based strategies. International Journal of Childbirth Education.	To analyze evidence about postpartum women in low income rural areas and their perceived breastfeeding support.	SR of evidence; qualitative and quantitative Level I	6 relevant articles	Search strategies including databases and key words were not described.	<u>Results:</u> The breastfeeding support strategy that has been found to maintain breastfeeding in low income postpartum women is telephone support. <u>Analysis:</u> Not discussed	<u>Limitations:</u> Small sample size. Semi-realistic use. Depends on the patient population and demographics of my project sample.
2) Bonuck (2014) Effect of primary care intervention on breastfeeding duration and intensity. American Journal of Public Health	To determine effectiveness of primary care pre- and post-natal interventions to increase breastfeeding.	Quantitative 2 Single blind RCTs (the BINGO study & the PAIRINGS study) Level II <u>Variables:</u> usual care vs electronically prompted (EP) anticipatory guidance vs lactation consultants (LC) integrated in primary care	Urban prenatal care centers in New York; BINGO: 666 women aged 18 or older PAIRINGS: 275 women	<u>Measures:</u> Breastfeeding initiation, duration, and intensity.	<u>Results:</u> Primary care interventions of EP and LC had 3-fold higher intensity and exclusivity at 3 months compared to usual care. <u>Analysis:</u> chi square test or Fisher exact test for categorical variables and analysis of variance for continuous variables. Binary logistic regression and multinomial logistic regression with 95% CIs.	<u>Limitations:</u> Primary outcomes were measured via maternal self-report, so social desirability bias may have been present. Study sample not representative of US population of child bearing age women, so limits generalizability. Realistic use.

<p>3) Gallegos (2014). Can a text message a week improve breastfeeding? BMC Pregnancy and Childbirth.</p>	<p>To evaluate the ability of an automated mobile phone text messaging intervention to increase breastfeeding rates, improve self-efficacy and positive coping strategies.</p>	<p>Non-concurrent, prospective, comparison trial Level III</p>	<p>120 self-selected women in the intervention group and 114 women in the comparison group. Convenience sample. Took place in Australia.</p>	<p><u>Measures:</u> Online questionnaire following participation in the 8-week intervention. Questions included demographics of mother and baby, current feeding practices, self-efficacy, social support, coping checklist, emotions, and breastfeeding knowledge and awareness. <u>Reliability:</u> Cronbach alpha range (0.79-0.97) for all questions utilized.</p>	<p><u>Results:</u> EBF rates in the intervention group were higher than the control group and was statistically significant ($P=0.05$). Mothers in control group had better coping skills. There was not a statistically significant difference between groups in level of self-efficacy. <u>Analysis:</u> T-tests; chi-square tests; ANCOVA; hierarchical regression</p>	<p><u>Limitations:</u> Not a randomized trial. Control and intervention groups were not run concurrently. Takes place in Australia. Realistic use. Could easily implement some form of mobile messaging program in the early weeks of infants lives as we encourage mothers to attend the support group.</p>
<p>4) Corriveau (2013). Evaluation of an office protocol to increase exclusivity of breastfeeding. Pediatrics.</p>	<p>To determine whether implementing a program based on a clinical protocol affects breastfeeding rates within a pediatric primary care setting.</p>	<p>RCT: Retrospective pre/post intervention design Level II</p>	<p>376 medical records for preintervention review and 381 records for review in the postintervention group. Convenience sampling Setting: 2 pediatric primary care offices in northern Virginia (1 urban and 1 rural).</p>	<p><u>Measures:</u> EBF rates and “any” breastfeeding rates <u>Reliability:</u> Not reported</p>	<p><u>Results:</u> EBF rates were higher in the postintervention group at every time point and were statistically significant at all time points ($P<0.01$). <u>Analysis:</u> t-test; chi-square test; logistic regression analysis</p>	<p><u>Limitations:</u> Lack of data regarding other parameters that may affect exclusivity and duration of breastfeeding (mother’s education level, socioeconomic status, smoking status, etc.). Realistic use. Primary care setting protocol that shows increase in number of EBF infants.</p>

<p>5) Cottrell (2013). Breastfeeding concerns and experiences of African American mothers. American Journal of Maternal Child Nursing</p>	<p>To explore experiences of African American women about breastfeeding</p>	<p>Qualitative Level VI</p>	<p>253 African American women age 18-35 years from 3 Florida counties</p>	<p><u>Measures:</u> Face-to-face interviews one month postpartum; Each interview was 1-2 hours long, held in a location chosen by participant, and tape-recorded</p> <p><u>Reliability:</u> Not mentioned</p>	<p><u>Results:</u> efforts need to be made to engage mothers in breastfeeding discussions ask questions and voice concerns. Education should be provided to mothers about benefits of breastfeeding to their own health. Breastfeeding classes and support groups were recommended.</p> <p><u>Analysis:</u> Data from interviews were transcribed and analyzed using MAXqda2007 through subject-level and thematic content analysis</p>	<p><u>Limitations:</u> Focus on African Americans may mask experiences from other racial groups. Overall focus was perinatal.</p> <p>Realistic use. Will be helpful to include these discussion points in breastfeeding support group topics.</p>
<p>6) Phillips (2011). First-time breastfeeding mothers: Perceptions and lived experiences with breastfeeding. International Journal of Childbirth Education</p>	<p>Develop an in depth understanding of the lived experience of breastfeeding</p>	<p>Qualitative, Level VI</p>	<p>19 women breastfeeding for the first time; part of a larger phenomenological study; setting not identified in this article</p>	<p><u>Measures:</u> Questionnaires and semi-structured interviews with open ended questions</p> <p><u>Reliability:</u> Not mentioned</p>	<p><u>Results:</u> Consistent information provided by health care providers is important. Reassurance, encouragement, and breastfeeding support were important for breastfeeding success. First-time breastfeeding mothers perceived an opportunity to talk about their experience to help other breastfeeding mothers.</p> <p><u>Analysis:</u> not identified in this article.</p>	<p>Limitations: Small sample size.</p> <p>Realistic use.</p>

7) Olson (2010). A quasi-experimental evaluation of a breastfeeding support program for low income women in Michigan. Maternal & Child Health Journal	To estimate the effectiveness of a peer counselor led breastfeeding program for low income women in Michigan.	Quasi-experimental design; Level III	336 women participating in WIC in the state of Michigan	<p><u>Measures:</u> Initial referral form/survey; state administrative data; forms filled out by the peer counselor</p> <p><u>Reliability:</u> Not mentioned</p>	<p><u>Analysis:</u> Multiple linear regressions</p> <p><u>Results:</u> The breastfeeding support group was very effective in increasing breastfeeding rates among the treatment group, with the treatment group breastfeeding for 2.6 weeks longer than the control group. The results were statistically significant at initiation ($P < 0.001$); at 3 months ($P = 0.002$) and at 6 months ($P = 0.008$).</p>	<p><u>Limitations:</u> True randomization did not occur in this study.</p> <p>Realistic use.</p>
8) Chung (2008) Interventions in primary care to promote breastfeeding: An evidence review for the USPSTF. Annals of Internal Medicine	To review evidence for the effectiveness of primary care interventions to promote breastfeeding	SR quantitative Level I	38 RCTs of primary care initiated interventions to promote breastfeeding, mainly in developed countries	<p><u>Measures:</u> Searches of MEDLINE, the Cochrane Central Register of Controlled Trials, and CINAHL</p>	<p><u>Results:</u> Breastfeeding interventions can be more effective than usual care in increasing short and long-term breastfeeding rates</p> <p><u>Analysis:</u> rate ratio; DerSimonian and Laird model for random-effects meta-analysis</p>	<p><u>Limitations:</u> Effects of each individual component of multicomponent interventions could not be measured. Some RCTs were of poor quality. Done in 2008.</p> <p>Realistic use.</p>

Authentic Presence

<p>9) MacVicar (2015). Supporting breastfeeding establishment among socially disadvantaged women: a meta-synthesis. Birth.</p>	<p>To review the literature exploring the perception of low-income and teenage mothers on their experience of breastfeeding support interventions</p>	<p>SR with Meta-synthesis; Level V</p>	<p>8 articles were used in this meta-analysis.</p>	<p><u>Measures:</u> Databases used include: ASSIA; Cochrane database; EBSCO; EthOS; Sage Journals; and OVID. Key words included: breastfeeding or lactation; support or intervention; teenage or adolescent; disadvantaged or deprivation or low income or women, infant and child or WIC; experiences or views or perceptions</p>	<p><u>Results:</u> three main themes were found: practical influences, psychological influences, and person-centered approach to breastfeeding approach. <u>Analysis:</u> all articles were read independently by two reviewers before inclusion. All articles were assessed using the JBI-Qualitative Assessment and Review Instrument</p>	<p><u>Limitations:</u> All the articles originated in high-income countries, so generalizability may be lacking.</p> <p>Realistic use.</p>
<p>10) Nolan (2015). Mothers' voices: Results of a survey of public health nurse-led breastfeeding support groups. Primary Health Care</p>	<p>To explore the experiences of mothers attending public health nurse-led breastfeeding support groups to provide recommendations to enhance the quality of the groups by considering mothers' voices.</p>	<p>Qualitative Level VI</p>	<p>96 mothers in Northern Ireland</p>	<p><u>Measures:</u> 10 question survey using Likert scale ratings as well as open ended questions.</p> <p><u>Reliability:</u> Not mentioned</p>	<p><u>Results:</u> Themes identified included: weighing babies at meetings, PHNs as group facilitators, self-efficacy. <u>Analysis:</u> responses to open ended questions were transcribed verbatim and a thematic data analysis performed. Likert scale data was put into Excel and descriptive statistics applied</p>	<p>Limitations: Took place in Ireland Support groups were chosen to participate based on size, and not randomized. All questions on the survey were worded positively, potentially leading to bias answers.</p> <p>Realistic use. Good ideas of things to include and avoid during a support group.</p>

<p>11) Busch (2014). Clinical practice breastfeeding recommendations for primary care: Applying a tri-core breastfeeding conceptual model. Journal of Pediatric Health Care.</p>	<p>To help APRNs develop and implement EBP efforts that incorporate the mother-baby dyad to support successful breastfeeding.</p>	<p>EBPG Level I</p>	<p>Primary care setting</p>	<p>Tri-Core Model</p>	<p>N/A</p>	<p>Requires buy-in from the entire multidisciplinary team.</p> <p>Realistic use.</p>
<p>12) Andaya (2012). Perceptions of primary care based breastfeeding promotion interventions: Qualitative analysis of randomized controlled trial participant interviews. Breastfeeding Medicine.</p>	<p>To examine women's perceptions and reported effects of routine, primary care based interventions to increase breastfeeding.</p>	<p>Mixed method: RCT with qualitative interviews Level IV</p>	<p>67 participants randomized into one of 4 treatment groups: electronic prompts, lactation consultant, electronic prompts AND lactation consultant, or control.</p> <p>Setting: Bronx, NY area; primary care</p>	<p><u>Measures:</u> Open-ended interview questions</p> <p><u>Reliability:</u> Not reported</p>	<p><u>Results:</u> The EP + LC group influenced both initiation and duration of breastfeeding. Women perceived the EP questions as the provider asking genuine questions and spending more time educating about breastfeeding. LC's were perceived to provide comfort and knowledge about breastfeeding.</p> <p><u>Analysis:</u> Interviews were analyzed using MAX.qda software.</p>	<p><u>Limitations:</u> Potential for recall and social desirability biases.</p> <p>Semi-realistic use.</p>

<p>13) Demirtas (2012). Strategies to support breastfeeding: A review. International Nursing Review.</p>	<p>To explore strategies to support breastfeeding</p>	<p>SR qualitative and quantitative Level I</p>	<p>38 articles: 12 qualitative, 19 quantitative, and 7 theoretical</p>	<p><u>Measures:</u> Databases used: CINAHL, PubMed, ScienceDirect, Scopus, Web of Science database, Cochrane database and Turkish health database. Key words: breastfeeding support, health professionals, midwife, nurse, strategies</p>	<p><u>Results:</u> Five themes emerged in the evidence as strategies to support breastfeeding: collaboration with community and family members, confidence building, the appropriate ratio of staffing levels, development of communication skills, and “closing the gap”. <u>Analysis:</u> All articles were reviewed individually by 2 experts.</p>	<p><u>Limitations:</u> Search took place in Turkey. Realistic use.</p>
<p>14) Kaunonen (2012). A systematic review of peer support interventions for breastfeeding. Journal of Clinical Nursing.</p>	<p>To describe peer support interventions supporting breastfeeding during pregnancy and the postnatal period.</p>	<p>SR quantitative and qualitative Level I</p>	<p>Initial search yielded 960 articles. Titles and abstracts reviewed for inclusion, and result included 34 articles (17 quantitative, 6 qualitative, 7 mixed method, 4 literature reviews).</p>	<p><u>Measures:</u> Searches of CINAHL, MEDLINE and the Cochrane Library databases from year 2000-2008.</p>	<p><u>Results:</u> Combination of professional and peer support was effective in ensuring the continuation of breastfeeding. <u>Analysis:</u> Two independent evaluators rated all the articles level of evidence using a Finnish Nurses Association scale.</p>	<p><u>Limitations:</u> Takes place in Finland. Data from support during pregnancy not applicable to this project. Semi-realistic use. Does have good research to support both professional and peer support to increase duration of breastfeeding.</p>

<p>15) Chen (2011). Sources of education about breastfeeding and breast pump use: What effect do they have on breastfeeding duration. Maternal & Child Health Journal</p>	<p>To examine the association between breastfeeding duration and sources of education about breastfeeding and breast pumps.</p>	<p>Non-experimental Longitudinal study Level IV</p> <p>Dependent variable: breastfeeding duration</p> <p>Independent variable: source of education</p>	<p>2586 women who completed the Infant Feeding Practices Study II</p>	<p><u>Measures:</u> Infant Feeding Practices Study II</p> <p><u>Reliability:</u> Not mentioned</p>	<p><u>Results:</u> A negative association between longer breastfeeding duration and receiving breast pump education from a physician/PA was found. There was a positive association between longer breastfeeding duration and receiving education from classes or support group as well as from friends/family. <u>Analysis:</u> chi-square test; ANOVA; logistic regression analysis</p>	<p><u>Limitations:</u> Selection bias possible due to use of a mailed survey.</p> <p>Realistic use. Shows education from support groups and family support is important.</p>
<p>16) Schmied (2011). Women's perceptions and experiences of breastfeeding support: A metasynthesis. Birth.</p>	<p>To examine women's perceptions and experiences of breastfeeding support to determine the components of support that they deemed "supportive"</p>	<p>Metasynthesis of qualitative data. Level V</p>	<p>Initial search yielded 254 studies. All studies were read by the investigators, and narrowed down to 31 relevant and high-quality studies.</p>	<p><u>Measures:</u> Searches of MEDLINE, CINAHL, the Cochrane Library, PubMed, Meditext, & PsycINFO from the year 1990-2007</p>	<p><u>Results:</u> 4 categories and 20 themes. Support occurs along a continuum. Facilitative approach is more helpful than a reductionist approach. <u>Analysis:</u> meta-ethnographic methods used to identify key concepts that were similar across studies.</p>	<p><u>Limitations:</u> Takes place in Australia</p> <p>Realistic use. Good to understand what women view as helpful vs. hindering.</p>

Maternal Self-Efficacy

Maternal Self-Efficacy						
17) Ingram (2013). A mixed methods evaluation of peer support in Bristol, UK: mothers', midwives' and peer supporters' views and the effects on breastfeeding. BMC Pregnancy & Childbirth	To determine the effects of a peer led breastfeeding support group on breastfeeding rates and to explore the perceptions of mothers, midwives, and peer supporters.	Mixed methods: both qualitative and quantitative; Level IV	163 surveys were completed from mothers in the Bristol area.	<p><u>Measures:</u> Online or telephone surveys were used for mothers in addition to the breastfeeding self-efficacy scale (BSES); a focus group was used to collect data from the peer supporters and midwives.</p> <p><u>Reliability:</u> Not mentioned</p>	<p><u>Results:</u> Mothers who were exclusively breastfeeding at the time of completing the BSES had the highest self-efficacy scores ($P < 0.001$). Those who were breastfeeding a second or subsequent baby were more confident than those feeding for the first time. Four main themes were found from interview data: antenatal opportunity for knowledge, postnatal reassurance, encouragement and self-confidence, and the challenges of peer support. There were small increases in breastfeeding initiation and duration rates, but they were not significantly significant.</p> <p><u>Analysis:</u> Breastfeeding rate data was analyzed using the chi-squared test. All interviews were digitally recorded, transcribed, anonymized and checks for accuracy before analysis.</p>	<p><u>Limitations:</u> Mothers completing surveys were most likely already "committed", therefore there may be bias in this data. Takes place in UK.</p> <p>Realistic use.</p>
18) Blyth (2002) Effect of maternal confidence on breastfeeding duration: an application of breastfeeding self-efficacy theory. Birth.	To assess the effect of maternal confidence on breastfeeding duration.	Prospective study Level IV	300 mothers Australia	<p><u>Measures:</u> Self-efficacy using the breastfeeding self-efficacy scale. Also used the breastfeeding status questionnaire</p> <p><u>Reliability:</u> Cronbach's alpha = 0.96 for BSES</p>	<p><u>Results:</u> Maternal breastfeeding self-efficacy is significantly related to breastfeeding duration and level. ($P < 0.001$ at 1 week and 4 months postpartum).</p> <p><u>Analysis:</u> one way ANOVA; t-tests; Pearson's correlations hierarchical regression</p>	<p><u>Limitations:</u> Interventions need to be evaluated to determine if maternal confidence can be enhanced to alter breastfeeding outcomes.</p> <p>Realistic use. Breastfeeding self-efficacy and maternal confidence may be able to be modified by providing breastfeeding support.</p>

Socioeconomic and Personality Traits						
19) Brown (2013). Maternal trait personality and breastfeeding duration: The importance of confidence and social support. Journal of Advanced Nursing.	To explore the associations among breastfeeding duration, maternal personality and attitudes and experiences of breastfeeding.	Exploratory cross-sectional survey. Level IV	602 mothers living in the UK with infants aged 6-12 months; babies were excluded if low birth weight or preterm	<u>Measures/Reliability:</u> Self-reported questionnaire included: Ten Item Personality Measure (Cronbach's alpha range of 0.73-0.89) to measure personality traits; breastfeeding data included initiation and duration, and exclusivity. Other questions included attitudes toward breastfeeding and reasons for cessation.	<u>Results:</u> Mothers who breastfed at birth reported higher extraversion, emotional stability, and conscientiousness. <u>Analysis:</u> exploratory factor analysis to group items into key themes. MANCOVA was used to examine differences in maternal personality for those who breast or formula fed. Spearman's correlations used to examine associations among maternal personality, breastfeeding duration, attitudes toward breastfeeding, and reasons for cessation.	<u>Limitations:</u> Self-selected sample, potentially more motivated women were participating. Predominantly white, older, highly educated sample. Realistic use. Good to know that maternal personality can play a role in what type of support a mother needs. Can lead to targeted support during groups.
20) Bosnjak (2009). Influence of sociodemographic and psychosocial characteristics on breastfeeding duration of mothers attending breastfeeding support groups. Journal of Perinatal Medicine.	To investigate duration of breastfeeding, sociodemographic and psychosocial characteristics of mothers attending breastfeeding support groups.	Control trial without randomization Level III	980 mothers and their full term, healthy, singleton babies	Measures: Sociodemographic factors: maternal age, education, marital status, employment, household monthly income, and the members in the household Biomedical factors: parity, previous experience with breastfeeding, attendance of antenatal classes, and smoking status Psychosocial factors: was the mother breastfed herself, the time of decision to breastfeed, duration of planned breastfeeding and social support during breastfeeding for the first 6 months of the infant's life.	Analyses: chi squared and Fischer exact test for frequencies; Mann-Whitney for continuous variables; univariate and logistic regression analysis; P values considered significant at $P < 0.05$ Results: successful breastfeeding at one month of age in all members of study group and 92.3% of control group. At three and six months, frequency was lower in control group than in the study group.	Takes place in Croatia. Mothers self-volunteered to participate, making it a possibility that these mothers were already motivated to breastfeed. Realistic use. Good info on different sociodemographic factors related to breastfeeding.

Use of Telemedicine Technology to Provide Breastfeeding Support						
<p>21) Ahmed (2016). The effect of interactive Web-based monitoring on breastfeeding exclusivity, intensity, and duration in healthy term infants after hospital discharge. Journal of Obstetric, Gynecologic, and Neonatal Nursing.</p>	<p>To determine if a web-based breastfeeding monitoring system would increase breastfeeding duration, intensity, and exclusivity rates.</p>	<p>RCT Level II</p> <p>Variables: Breastfeeding rates of exclusivity, intensity, and duration</p>	<p><u>Sample:</u> 141 mother/infant dyads</p> <p><u>Setting:</u> Three Midwest hospitals</p>	<p><u>Measures:</u> Pattern of breastfeeding (exclusive, predominant, partial); breastfeeding duration; breastfeeding intensity (# of breastmilk feedings per day divided by the number of feedings per day). <u>Reliability:</u> content validity index value of 0.79</p>	<p><u>Results:</u> Significant difference in breastfeeding pattern was found between groups at 1 month ($p=0.027$), 2 months ($p=0.000$), and 3 months ($p=0.002$). Intervention group had higher exclusivity. <u>Analysis:</u> Descriptive statistics for demographics; differences between groups assessed with chi-squared and t-tests</p>	<p>Limitations: Not a good representation of Hispanic or Asian population.</p> <p>Realistic use. Web-based intervention can lead to statistically significant increase in breastfeeding rates.</p>
<p>22) Friesen (2015). Using videoconferencing technology to provide breastfeeding support to low-income women: Connecting hospital-based lactation consultants with clients receiving care at a community health center. Journal of Human Lactation.</p>	<p>To explore the feasibility of using videoconferencing services to facilitate access to breastfeeding education and support between IBCLCs and low-income women.</p>	<p>Pilot Project Qualitative Level VI</p>	<p><u>Sample:</u> 35 mothers</p> <p><u>Setting:</u> Community Health Center in Indiana</p>	<p><u>Measures:</u> Telephone Interviews <u>Reliability:</u> Not reported</p>	<p><u>Results:</u> Videoconferencing allowed mothers to receive timely, expert, and accurate breastfeeding support while saving travel time and expense for the mother. <u>Analysis:</u> Not reported</p>	<p><u>Limitations:</u></p> <p>Realistic use. Supports feasibility of using videoconference sessions to provide breastfeeding support.</p>

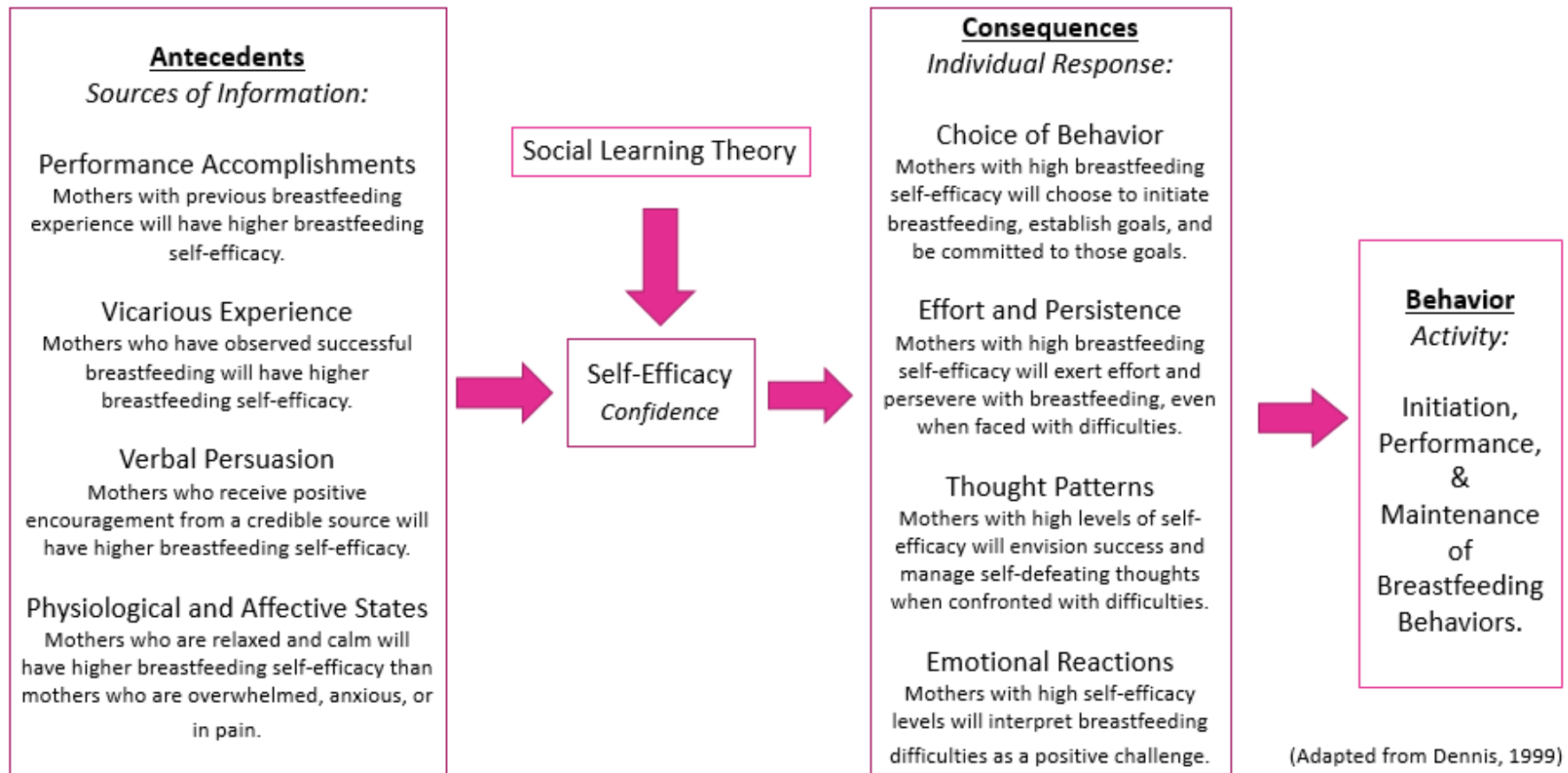
<p>23) Habibi (2012). Remote lactation consultation: A qualitative study of maternal response to experience and recommendations for survey development. Journal of Human Lactation.</p>	<p>To describe the maternal experience of lactation consultation using videoconferencing compared to face-to-face care.</p>	<p>Qualitative Level VI</p>	<p><u>Sample</u>: 12 mothers <u>Setting</u>: Breastfeeding center in Tennessee</p>	<p><u>Measures</u>: Telephone interviews <u>Reliability</u>: Not reported.</p>	<p><u>Results</u>: All mothers reported being very comfortable with the technology. All mothers were satisfied with face-to-face consultation. 6 mothers were “very satisfied”, 5 mothers were “somewhat satisfied” and 1 mother was “somewhat unsatisfied” with the remote consultation. <u>Analysis</u>: Recordings were transcribed verbatim and coded by research assistants.</p>	<p>Limitations: small sample size Realistic use. Direct comparison of videoconference and face-to-face lactation consultation</p>
<p>24) Macnab (2012). Breastfeeding and telehealth. Journal of Human Lactation.</p>	<p>Roundtable discussion of lactation expert’s opinions of using telemedicine for providing lactation support.</p>	<p>Expert Opinion Level VII</p>	<p>Sample: 3 experts in the lactation field.</p>	<p>N/A</p>	<p>Results: Some experts have incorporated telehealth technology to provide breastfeeding support to breastfeeding mothers. It is perceived that videoconferencing sessions are similar to face-to-face sessions.</p>	<p>Realistic use.</p>

<p>25) Rojjanasirat (2012). A pilot study of home-based videoconferencing for breastfeeding support. Journal of Human Lactation.</p>	<p>To assess the reliability and feasibility of home videoconferencing for breastfeeding assessment and support.</p>	<p>Pilot study. Quasi-experimental Level III</p>	<p>Sample: 10 mother-infant dyads</p> <p>Setting: Maternity unit of an academic health center and a birthing center in a Midwestern city</p>	<p>Measures: the LATCH assessment tool; Telehealth Assessment Checklist; Interactive Home Telehealth Satisfaction (IHTS) Reliability: IHTS has Cronbach's alpha of 0.76</p>	<p>Results: Assessment of latch and comfort were harder via videoconference. Mean IHTS score was 75.1 (range 18-90); 7/10 mothers reported that talking to an IBCLC via videoconferencing was similar to talking in person. Analysis: interrater reliability scores of the LATCH scores.</p>	<p>Limitations: small sample size</p> <p>Realistic use. Similar setting to this project.</p>
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Appendix E

Theory Application Diagram

Theory Application

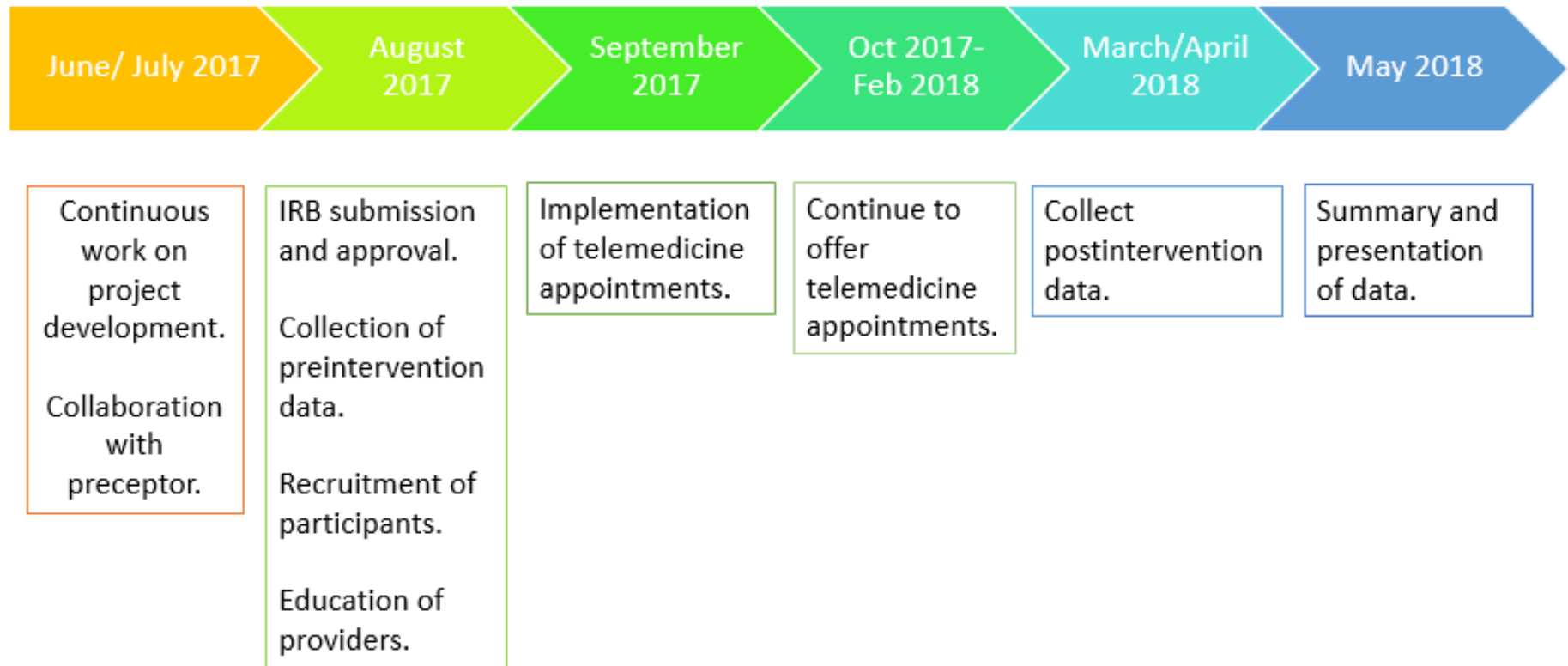


Appendix F
Logic Model

Logic Model for DNP Project					
Student: Sarah Burkhart					
Inquiry, PICOTS: In breastfeeding mother-infant dyads, does utilizing telemedicine to provide breastfeeding support in a pediatric primary care office, compared to the current practice of offering on-site breastfeeding support groups, increase duration and exclusivity of breastfeeding, over a three-month period?					
Inputs	Intervention(s)		Outcomes -- Impact		
	Activities	Participation	Short	Medium	Long
<p>Evidence, sub-topics</p> <ol style="list-style-type: none"> Breastfeeding support can increase duration and exclusivity. Authentic presence from a healthcare provider is helpful to a breastfeeding mother. Maternal self-efficacy level is associated with breastfeeding success and duration. Certain socioeconomic and maternal personality traits can affect breastfeeding success and duration. Using telemedicine technology can be an innovative and effective way to provide support to certain patient populations. <p>Major Facilitators or Contributors</p> <ol style="list-style-type: none"> Buy-in from staff DNP faculty Support from project site <p>Major Barriers or Challenges</p> <ol style="list-style-type: none"> Low-income population Access to internet 	<p>EBP intervention which is supported by the evidence:</p> <p>Breastfeeding support via telemedicine</p> <p>Major steps of the intervention (brief phrases)</p> <ol style="list-style-type: none"> Obtain IRB Create a team of leaders to help implement the project. Collect preintervention data. Educate primary care providers on availability of telemedicine appointments. Advertise the telemedicine appointments and encourage breastfeeding mothers to schedule. Implement appointments. Collect post intervention data. Evaluate data. Disseminate the data. 	<p>The participants:</p> <p>Breastfeeding mother-infant dyads who are patients of the primary care clinic.</p> <p>Site</p> <p>Primary Care Clinics local pediatric facility</p> <p>Time Frame</p> <p>1 year</p> <p>Consent or assent Needed</p> <p>Consent from mothers for participation</p> <p>Other person(s) collecting data</p> <p>Yes. DNP student and providers at the site.</p> <p>Others directly involved in consent or data collection</p> <p>No.</p>	<p>(Completed during DNP Project)</p> <p>Outcome(s) to be measured</p> <p>Primary: breastfeeding duration and exclusivity rates</p> <p>Measurement tool(s)</p> <p>EMR data of "breastfeeding" "bottle feeding" or "breastfeeding with bottle supplementation"</p> <p>Statistical analysis to be used</p> <ol style="list-style-type: none"> Descriptive statistics Wilcoxon signed-ranks test 	<p>(after student DNP)</p> <p>Outcomes to be measured</p> <ol style="list-style-type: none"> Continued assessment of breastfeeding duration and exclusivity Assessment of number of referrals from primary care providers. Assessment of maternal breastfeeding self-efficacy scores. 	<p>(after student DNP)</p> <p>Outcomes that are potentials</p> <ol style="list-style-type: none"> Development of a breastfeeding educational series for primary care providers. Cost analysis of breastfeeding support via telemedicine.

Appendix G

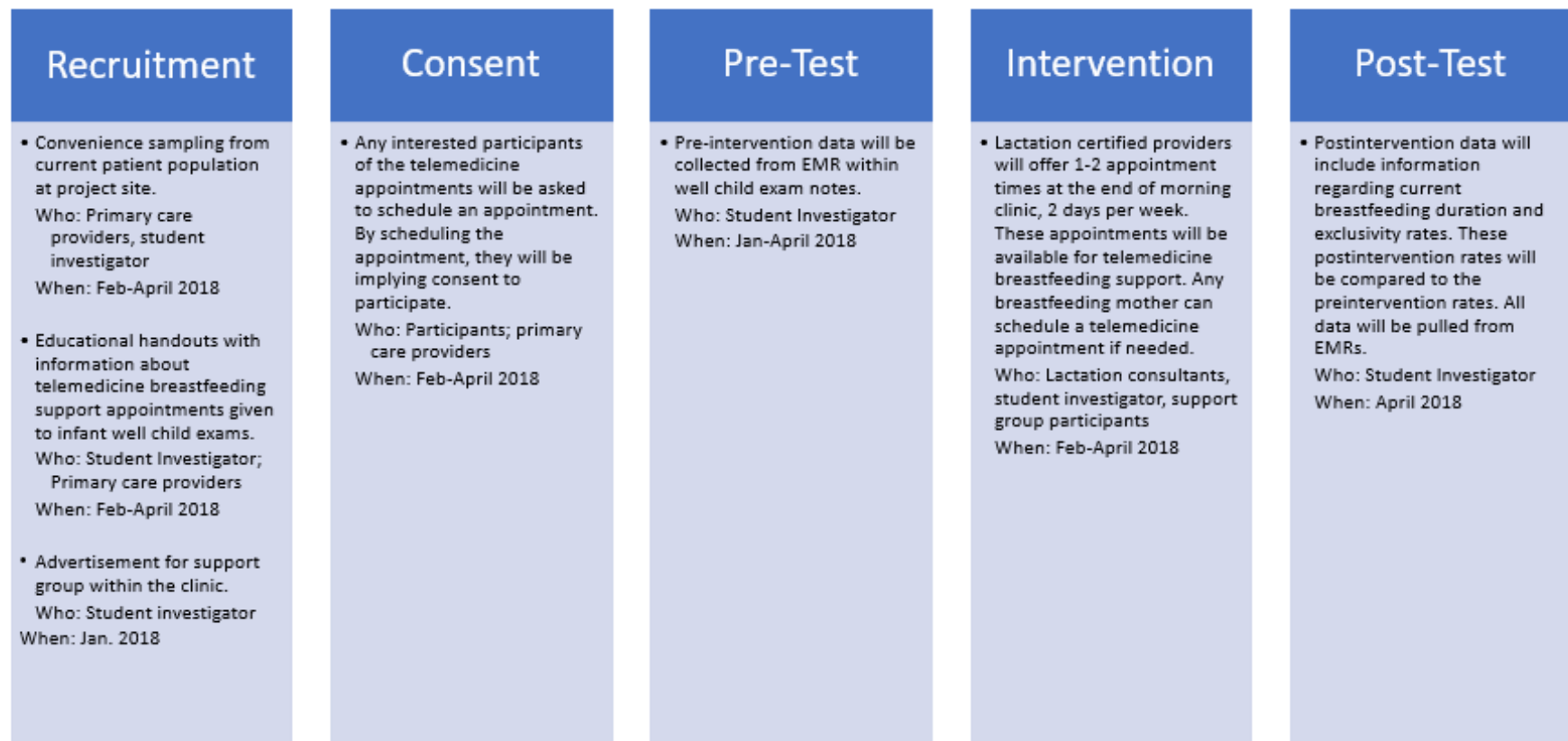
Project Timeline



Appendix H

Intervention Flow Diagram

Intervention Participant Flow Diagram



Appendix I

Recruitment Materials



NOW AVAILABLE:
Telemedicine Breastfeeding
Support Appointments

What is a telemedicine breastfeeding support appointment?

- A one-on-one consultation with a lactation consultant that occurs over video conference
- An opportunity to receive breastfeeding support from home
- Use the camera on your computer or tablet
- Appointments are offered Monday and Thursday each week
- Call to schedule yours today!

Appendix J

IRB Approval Letter

NOTIFICATION OF INITIAL APPROVAL

12/14/2017 4:26 PM

From: Office of Research Integrity
 To: [Sarah Burkhart](#), Principal Investigator

IRB#: [17080507](#)

Study Title: Using Telemedicine to Improve Breastfeeding Rates in a Primary Care Setting

General Pediatrics

Funding:

Protocol Name/#: Telemed & Breastfeeding

Dear Burkhart,

On 12/14/2017, the IRB reviewed the above-titled new study by **expedited review** under 45 CFR 46.110 category 5 for research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes. The IRB approved the submission from **12/14/2017** to **12/13/2018**.

The IRB approved the MARS application as of 12/14/2017 which included the following study documents:

UMKC Request to Rely History	11/1/2017 5:58 PM	0.01
Project Protocol Telemed and Breastfeeding.docx History	12/9/2017 8:55 AM	0.04
Prospective Group Excel Doc History	11/1/2017 5:53 PM	0.01
Red Cap Data Collection Template History	10/12/2017 5:55 PM	0.01
Retrospective Group Excel Doc History	11/1/2017 5:52 PM	0.01

Approved Permission/Assent/Consent Process(es):

Waiver of parental permission (cannot be applied to FDA regulated research)

Waiver of child assent

Waiver of consent for adult subjects (cannot be applied to FDA regulated research)

Approved HIPAA Authorization Process(es):

Waiver of HIPAA Authorization

Reminder of Principal Investigator Responsibilities:

- You are required to submit a continuing review report within MARS *30 days prior to your expiration date*. If continuing review approval is not granted before the expiration date of **12/13/2018** approval of this protocol expires on that date.
- Notify the IRB immediately upon termination of the project and/or departure of the Principal Investigator from the institution or project.
- **Report any changes or deviations** in the protocol to the IRB **prior to implementation**.
- Report any unexpected significant adverse events or problems related to your study promptly to the IRB.
- Maintain copies of all pertinent information related to research activities, including copies of all signed informed consent agreements obtained from participants (if applicable).

Sincerely,

D. S., M.D.

Co-Chair, Pediatric Institutional Review Board

D. S., D.Min.

Co-Chair, Pediatric Institutional Review Board

R. M., M.S., P.M.P.

Director, Office of Research Integrity

Appendix L

Statistical Analysis Table

Table 1: Breastfeeding Rates

	<i>Preintervention Percentage (N=22)</i>	<i>Postintervention Percentage (N=35)</i>
<u>Duration</u>		
0-2 weeks	27.3	8.6
2 weeks-1 month	13.6	28.6
2 months-3 months	18.2	20
4 months-6 months	13.6	40
> 6 months	27.3	2.9
<u>Exclusivity</u>		
Breastmilk only	31.8	40
Breastmilk with formula supplementation	45.5	54.1
Formula Only	22.7	8.6



July 10, 2017

Members of UMKC Institutional Review Board University of Missouri-Kansas City Kansas
City, MO 64108

Primary Project Site IRB

UMKC IRB or Primary Project Site IRB,

This letter serves to provide documentation regarding Sarah Burkhart's Doctor of Nursing Practice (DNP) Project proposal. Ms. Burkhart obtained approval for her project proposal, *Using Telemedicine to Improve Breastfeeding Outcomes in the Primary Care Setting*, from the School of Nursing DNP faculty committee on July 10, 2017.

If I can provide any further information, please feel free to contact me.
Sincerely,

Susan J. Kimble, DNP, RN, ANP-BC, FAANP Clinical Associate Professor DNP Programs
Director UMKC School of Nursing and Health Studies
816-235-5962
kimbles@umkc.edu