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IMPLEMENTATION OF A PRENATAL ELECTRONIC EDUCATION PROGRAM TO
IMPROVE EXCLUSIVE BREASTFEEDING INITIATION RATES IN NEW MOTHERS

by

K. CHRISTY BLEDSOE

A DNP Final Report submitted in partial fulfillment
of the requirements for the degree of
Doctor of Nursing Practice
School of Nursing

Cheryl D. Parker, Ph.D., RN-BC, CNE, Committee Chair
School of Nursing

University of Texas at Tyler
April 2023

The University of Texas at Tyler
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I would also like to acknowledge the many colleagues who assisted me with ideas, reports, and information. To my DNP cohort, who shared in the struggles of school, working, and managing life.

To my family, who have been by my side and supported me through it all. And to the Lord above for putting the desire in my heart to have a passion for moms and babies from the very start of my nursing career.

Dedication

This project is dedicated to all the mothers and babies whom I have worked with over the last 20 years trying to do “the right” thing by following best practice recommendations from their providers and experts. It is a labor of love to nourish your child no matter how you are best able to do this. I have learned so much over the years working with mothers and babies, and it is to them I dedicate this project.

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Abstract

IMPLEMENTATION OF A PRENATAL ELECTRONIC EDUCATION PROGRAM TO IMPROVE EXCLUSIVE BREASTFEEDING INITIATION RATES IN NEW MOTHERS

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April 2023

Breastfeeding is accepted as the best source of infant nutrition exclusively for the first six months of life. Because it is important to both mother and infant for long-term health benefits, exclusive breastfeeding at discharge has been a CMS Perinatal Core Measure since 2015. It is essential that hospitals have personnel and programs in place to support breastfeeding mothers to support the Healthy People 2030 goal of exclusive breastfeeding for the first six months of life. COVID-19 changed how the world interacted and medical staff had to use innovative techniques to engage and educate patients virtually since social distancing prohibited normal in-person appointments and interactions that would have normally occurred. Younger clientele may actually prefer online or virtual exchanges over in-person interactions according to literature. Therefore, the question was, how do you improve exclusive breastfeeding rates in facilities during a pandemic when normal interactions are not allowed due to social distancing requirements? Practice question: Does a prenatal electronic education program improve exclusive breastfeeding rates in new mothers prior to discharge? The literature supports any education, specifically, electronic methods, can improve exclusive breastfeeding rates.

Chapter 1

Nature of the Problem

Childbirth is a unique time with special considerations for both mother and child, with many cultural and familial influences affecting childbirth decisions in normal, non-pandemic situations. COVID-19 has added a unique set of challenges for the perinatal population. Early guidelines called for the separation of a COVID positive mother and infant, which significantly disrupted breastfeeding initiation and affected the feeding patterns of many new mothers (Lubbe et al., 2020). Decreased access to in-person lactation support were expressed by patients and reassurance was often needed to help manage anxiety and stress with breastfeeding in uncertain times (Schindler-Ruwisch et al., 2021). Social distancing created less opportunities for in-person interactions and pandemic-related restrictions have limited traditional models of lactation. Limited in-hospital support and during the postpartum period were noted particularly among groups with diminished access to telehealth resources, which has the potential to increase racial breastfeeding disparities if there is inequitable access (Schindler- Ruwisch et al., 2021). The same study found that virtual lactation support was only modestly effective compared to in-person support. Many institutions began looking for alternatives to reach this vulnerable population.

Background and Significance

It is well documented that breastfeeding is best for human infants (Centers for Disease Control [CDC], 2021, February 22; American Academy of Pediatrics [AAP], 2012; World Health Organization [WHO], 2021) and demonstrates many health benefits for both mothers and infants. It is recommended that newborn infants are exclusively breastfed for the first six months of life to provide adequate nutrition and health benefits for infants. “Exclusive breastfeeding [EBF] means that the infant does not receive any additional foods (except vitamin D) or fluids unless medically recommended” (WHO, 2021).

It is essential that mothers establish effective and exclusive breastfeeding techniques in the early days to promote continued exclusive breastfeeding through the recommended minimum of six months of age. In-person lactation support is ideal for supporting new lactation mothers as lactation consultants (LCs) are experts in human lactation techniques and problem solving when problems arise (Patel, 2016). Many facilities offer lactation support to discharged patients in the outpatient setting, which also supports breastfeeding mothers and supports continued breastfeeding practices as recommended by health professionals (CDC, August 24, 2021).

Breastfeeding Benefits

Breastfeeding benefits extend well beyond the infant years for the child. Benefits for the child include decreased respiratory illnesses, obesity, Type I diabetes, sudden infant death syndrome and gastrointestinal illnesses (CDC, 2021, August 24). Benefits for the mother include decreased risk for hypertension, type 2 diabetes, and ovarian and breast cancers (CDC, 2021, August 24). Current rates of breastfeeding prevent almost 20,000 deaths from breast cancer each year, and another 20,000 deaths could be prevented by improving breastfeeding practices (WHO, 2021).

While it is well accepted in the medical world that breastfeeding is best, continued low rates of breastfeeding in the United States add more than \$3 billion in medical costs for both mothers and infants (CDC, 2021, August 24). Investigators calculated the current costs of 10 pediatric diseases for which there is evidence of a protective effect of breastfeeding -- including eczema, middle-ear infections, lower respiratory tract infections like pneumonia, asthma, type 1 diabetes and sudden infant death syndrome (SIDS). They then estimated what the cost savings would be if 90 percent of new mothers in the U.S. breastfed exclusively for six months, as is generally recommended. The researchers calculated the direct costs of medical care, as well as indirect expenses, such as parents' time away from work to care for a sick child (Bartick & Reinhold, 2010). In most recent estimations, the U.S. could save \$17 billion per year, as well as

prevent 911 annual deaths -- mainly from SIDS, necrotizing enterocolitis (an intestinal disorder seen mainly in preterm infants) and respiratory infections.

Even more recently, the discovery of the significance of the microbiome established at birth through exposure to healthy bacteria through the birth canal and breastfeeding can significantly affect a person's ability to be protected against metabolic and immune diseases in the future (Mueller, Bakacs, Combellick, Grigoryan, & Dominguez-Bello, 2015). Because a newborn's gut is sterile at birth, this is the opportune time to establish a healthy gut biome to promote health for a lifetime of health benefits.

Socioeconomic Factors

According to a report from UNICEF that analyzes breastfeeding rates globally, countries of similar economic stature as the United States, including France and Ireland, have the lowest breastfeeding rates compared to children of low and middle-income countries. (UNICEF, 2021). Some experts believe these lower rates in prosperous nations are due to the personal, family, community, social, economic, and legislative environments of the country and for each family including paid leave time, need to work, and support offered (Howard, 2018).

The consideration of regional norms is an important aspect in breastfeeding rates, particularly in the southern United States. Cultural factors are influential in exclusive breastfeeding infants. For example, Black infants are 15% less likely to have ever been breastfed than White infants (CDC, 2017). According to a CDC telephone survey, 54.4% of African American mothers, 74.3% White mothers, and 80.4% of Hispanic mothers ever attempted to breastfeed. Numbers shift widely based on region, with the southeast generally experiencing lower rates (Woznicki, 2010). The CDC acknowledges that culture may be a factor in this regional difference.

Common barriers to breastfeeding may be particularly important in minority mothers due to existing cultural and economic factors and lack of breastfeeding support (Jones, Power,

Queenan, & Schulkin, 2015). In addition to these barriers mentioned, any breastfeeding mother may experience challenges that include:

- pain/discomfort
- lack of social and cultural acceptance
- inconvenience
- employment
- lack of knowledge regarding feeding practices
- lack of maternal knowledge that supports initial and continued breastfeeding
- acculturation
- lifestyle choices
- lack of support from family or friends
- the healthcare community
- and perceived milk supply issues.

These are important factors to consider when addressing newborn EBF rates.

Significance of the Problem

Even pre-pandemic, low rates of breastfeeding in the United States existed, adding more than \$3 billion in medical costs for both mothers and infants (CDC, 2021, August 24). In 2011, *The Surgeon General's Call to Action to Support Breastfeeding* outlined action steps to support breastfeeding and improve breastfeeding longevity across multiple settings, including a call to better understand health disparities that may impact breastfeeding rates (CDC, 2017). A review by the CDC of U.S.-based randomized trials evaluating breastfeeding interventions targeting minorities showed that group prenatal education, peer counseling interventions, and breastfeeding-specific appointments focused on breastfeeding, and enhanced hospital practices with WIC-based services positively affected breastfeeding outcomes among minority women (CDC, 2017). While one-on-one teaching demonstration is ideal for breastfeeding support and

enhances exclusive and long-term breastfeeding (Meedya et al., 2017), lack of time and medical personnel may present challenges in direct support of breastfeeding mothers during the Postpartum period. COVID-19 has presented additional challenges with outpatient support due to social distancing considerations. Due to this challenge, organizations supporting maternal patients have adapted with innovative strategies to engage and support mothers through pregnancy and beyond (Ferraz Dos Santos et al., 2020).

Internal Evidence

Low Exclusive Breastfeeding Rates

As of January 1, 2014, The Joint Commission's Perinatal Care core measure set became mandatory for all hospitals with 1,100 or more births per year. One of the five core measures includes exclusive breastmilk feeding in the inpatient setting. In 2015, the Joint Commission revised this statement to capture those mothers who exclusively breastfed their infants during their entire hospital stay, meaning no other fluids were given including formula (Joint Commission, 2015). Specific criteria were established with very few exceptions for well newborns. Healthy People 2020 set a goal of 81.9% of infants *ever* breastfeeding (USBC, 2021). Healthy People 2030 goals include 83.9% of infants *ever* breastfeeding and EBF at 42.4% at six months of age, an increase from 24.9% (CDC, August 24, 2021). However, the Joint Commission did not set a specific benchmark, but only that improvement is noted as "an increase in the rate" (The Joint Commission, 2015). To meet these goals, much work is needed.

Anecdotal evidence from Lactation Consultants and inpatient obstetric management identify exclusive breastfeeding rates are not at target for the facility, specifically, that the numbers of EBF rates in the inpatient setting has decreased, especially over the last year, during the challenge COVID-19 presented. Clinic nurses reported little to no time to help educate perinatal patients during their regularly scheduled prenatal clinic visits about the benefits of exclusive breastfeeding. In-person breastfeeding classes were canceled and moved

to virtual only. Nursing forums indicated that many hospitals eliminated lactation outpatient visits completely during the pandemic.

Analytics from Epic indicate from 2019 through 2021, monthly EBF rates ranged from 20-40% for mothers prior to discharge from the hospital setting. For this project, a realistic goal was set for an increase of 15% from the previous month, which varies, depending on data.

External Evidence

To support breastfeeding mothers, many hospitals adhere to *Ten Steps for Successful Breastfeeding* to indicate to the public the facility focuses on breastfeeding-specific care and use evidence-based guidelines to provide optimal care for childbearing families (Monroe, Linares, & Ashford, 2021). The *Texas Ten Steps* program recommends 10 steps for hospitals to achieve the certification that indicates a commitment to exclusive breastfeeding with a hefty goal of 82% of mothers exclusively breastfeeding at discharge (Texas Ten Step, 2022). Hospitals that adhere to these steps are associated with improved breastfeeding practices and increase exclusivity and duration (CDC, 2021, July). Because of the challenge of in-person lactation support due to the pandemic, some facilities looked to technology to fill the gaps between in-person visits.

Technological Support

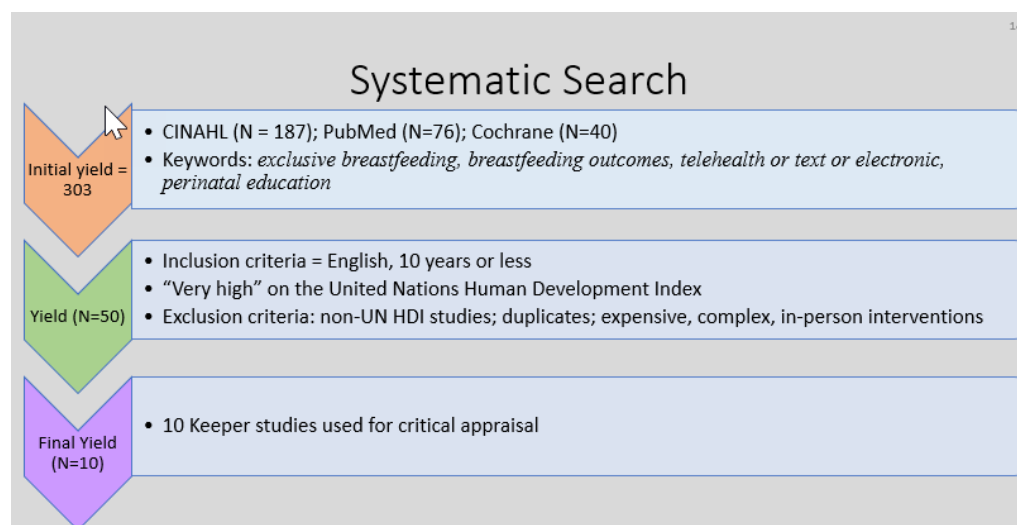
The millennial generation (born between 1980 and 2000) is of childbearing age and are accustomed to immediate access of information, typically through social networking and internet sites as their primary source of information and many prefer texting and smart phone apps over face-to-face communication (Hussey et al., 2016). The use of internet sources does not always equal quality, however. Quality, evidence-based applications and websites can be used in this population to improve health outcomes. A review of literature indicate that telehealth interventions can improve obstetric outcomes related to breastfeeding (DeNicola et al., 2020; Skouteris et al., 2017; Harari et al., 2018; Wilson, 2020; Gallegos et al., 2014; Brown et al.,

2014) and provide extra support when in-person visits are limited due to time, personnel, or pandemics. “The application and widespread use of telemedicine and remote monitoring moves us toward healthier populations and avoidance of costly hospital care” (Sherrod & Goda, 2016).

A preliminary search of the literature yielded 303 studies that give promise to the impact of interventions to improve exclusive breastfeeding. Keywords from the PICOT question used for the search were *exclusive breastfeeding, breastfeeding outcomes, telehealth or text or electronic, perinatal education* across all databases. Keywords were systematically searched individually and then combined to yield the most relevant articles in each database. Three databases were searched with this technique: (1) CINAHL, (2) PubMed, and (3) Cochrane. In CINAHL, 187 results were found using combined Keyword searching. In PubMed, 76 results were obtained using combined Keyword searching. In Cochrane, 40 results were obtained using combined keyword searching. Inclusion criteria included English and 10 years old. These criteria were applied to the combined set search results from all 3 databases, with a yield of 50 articles. Once all three databases’ yields were reviewed, 10 studies were retained for the body of evidence.

Figure 1

Systematic Search



Development of the Clinical Question

Therefore, the following question arises. In new mothers (P), how does a targeted prenatal exclusive breastfeeding electronic education program (I) compared to in hospital-only education without the electronic education program (C) affect exclusive breastfeeding rates of mothers at discharge (O) over three months (T)?

Conclusion

In conclusion, evidence indicates that any support given for breastfeeding helps increase exclusive breastfeeding rates. Due to the current climate of COVID-19, nursing support has needed to adjust to allow for innovative interventions, including telehealth and internet-based applications. Additionally, millennials are of child-bearing age and prefer technology-based support over face-to-face support. This evidence-based project has important implications for nursing practice considering the current climate and patient preferences.

Chapter 2: Body of Evidence

Critical appraisal involves selecting the best available evidence for clinical decision making. The PICOT question helps to organize search information in a way that makes sense to direct the search to find good evidence. Distinguishing reliable evidence from unreliable evidence is at the heart of this process with the goal of performing interventions that will produce the intended outcome based on best available evidence (Melnyk & Fineout-Overholt, 2019). The evaluation process helps to determine what to make of the evidence found in the critical appraisal process. Evaluation determines similarities across studies and how to base practice and standards of care based on quality evidence to help answer the clinical question (Melnyk & Fineout-Overholt, 2019). Information was organized into the table where evaluation of data was analyzed that helped to answer the PICOT question. The level of evidence tables, categorizes studies by levels of evidence from highest to lowest.

Table 1

Level of Evidence for Intervention included in the Body of Evidence Synthesis Table

Level of Evidence	1	2	3	4	5	6	7	8	9	10
LEVEL 1: Systematic Review/Meta-analysis/integrative Review	X	X	X							
LEVEL II: Single RCT				X	X	X				
LEVEL III:QE studies & non-randomized trials										
LEVEL IV: Cohort & Case-control studies							X			
LEVEL V: Systematic Review (meta-synthesis) of QUAL studies (or descriptive studies)										
LEVEL VI: Single QUAL or DESC studies								X	X	X
LEVEL VII: Expert Opinion										

Legend: 1 = Skouteris et al., (2017); 2 = Patnode et al., (2016); 3 = DeNicola et al., (2020); 4 = Puhari et al., (2020); 5 = Kellams et al., (2016); 6 = Ahmed et al., (2016); 7 = Harari et al., (2018); 8 = Wilson, (2020); 9 = Gallegos et al., (2014); 10 = Brown et al., (2014)

The synthesis table with interventions combines information that is common and found across studies that help to address the clinical question in what is known and what should be done to improve outcomes in a specific population, with recommendations for practice. The table provides clarity and simplicity (Melnyk & Fineout-Overholt, 2019). Technology was the

intervention analyzed for effectiveness across applicable studies and the “X” indicates which ones were used. The literature indicated that postnatal was most commonly used with text messaging with internet and web-based support. Of interest for this project, is prenatal education, prior to coming to the hospital to give birth.

Table 2

Interventions that Improve Exclusive Breastfeeding and Outcome Synthesis Table

Intervention	1	2	3	4	5	6	7	8	9	10
Text Messaging	X		X				X		X	X
Internet/web-based	X		X			X		X		
Prenatal education	X	X	X	X			X			
In-person support	X	X								
Telephone	X			X						
Postnatal education	X	X	X	X	X	X	X		X	X

Legend: 1 = Skouteris et al., (2017); 2 = Patnode et al., (2016); 3 = DeNicola et al., (2020); 4 = Puharic et al., (2020); 5 = Kellams et al., (2016); 6 = Ahmed et al., (2016); 7 = Harari et al., (2018); 8 = Wilson, (2020); 9 = Gallegos et al., (2014); 10 = Brown et al., (2014)

The outcomes table indicates which interventions were effective in the expected outcomes. The table below indicates that interventions to improve exclusive breastfeeding are affected both *prior* to discharge and *post* discharge. For this project, I am particularly interested in pre-discharge rates.

Table 3

Outcomes Synthesis Table

OUTCOME	1	2	3	4	5	6	7	8	9	10
Postnatal Education	X	X	X	X	X	X	X		X	X
Prenatal Education		X	X	X			X			
Text Messages		X	X				X		X	X

Legend: 1 = Skouteris et al., (2017); 2 = Patnode et al., (2016); 3 = DeNicola et al., (2020); 4 = Puharic et al., (2020); 5 = Kellams et al., (2016); 6 = Ahmed et al., (2016); 7 = Harari et al., (2018); 8 = Wilson, (2020); 9 = Gallegos et al., (2014); 10 = Brown et al., (2014)

NE = Not evaluated; NR = not reported; ↑ = increased; -- = no effect
*Measurement outcome

Search For Evidence and Results

In critical appraisal, studies are evaluated for validity, reliability, and applicability to answer the clinical question presented (Melnyk & Fineout-Overholt, 2019, p. 21). Johns Hopkins Evidence-Based Practice for Nurses and Healthcare Professionals Model was used for this study. Articles for this project were evaluated to determine “keeper” studies that would be used for evidence in the project. Articles were selected based on the intervention identified for the project which included an educational component for perinatal patients that evaluated exclusive breastfeeding outcomes. Analysis resulted in 10 articles which included three systematic reviews, three randomized controlled trials, one cohort study and three descriptive studies. Studies were analyzed using the Johns Hopkins Appraisal Forms.

Critical Appraisal

Level I Systematic Reviews

Three systematic reviews (SRs) were identified for the project and are considered “the most rigorous approach to minimization of bias” in reviewing evidence available (Melnyk & Fineout-Overholt, 2019, pp. 171). These compilations look at specific intervention criteria for the purpose of summarizing and communicating the results of all the research available to a clinical question. Due the COVID-19 pandemic, innovating techniques were employed to reach patients in a meaningful way since face-to-face interactions were reduced, yet breastfeeding mothers still required breastfeeding support. During the search, several studies using text-messaging (short SMS messaging) were noted to be from China, Bangladesh and Malaysia. Studies were selected based on taking place in developed countries and defined as “very high” on the United Nations Human Development Index to ensure applicability to a US setting (United Nations, 2014).

Skouteris et al. (2017) evaluated RCTs (Randomized Controlled Trials) published from June 2013 to December 2016 that used interventions to promote exclusive breastfeeding in high-income countries. Four of 12 studies indicated an increase in EBF implemented by

telephone, text message, or through a website. Some success also resulted from prenatal education or in-hospital support. All successful interventions had lengthy postpartum support or an education component. While overall length of breastfeeding was reported as increased, EBF at discharge was not specifically evaluated. This SR indicates that technological interventions can be effective for improving EBF.

In 2008, the US Preventative Services Task Force (USPSTF) recommended interventions to support breastfeeding. The purpose of this updated review was to update the 2008 recommendations. New available studies were analyzed as well as review of previous studies. In total, 52 studies were included based on criteria. Twenty-one studies were carried forward and synthesized with new evidence. The review indicated that individual-level support and educational interventions were associated with “a statistically significant higher likelihood” of exclusive breastfeeding compared with women with usual care (95% CI, 1.03 to 1.11). Interventions were reported as “fair” or “good.” The limitation of this review is that it included any intervention, so it is difficult to determine what intervention was most successful. What this SR does indicate, however, is that *any* breastfeeding intervention promotes and may enhance longevity of exclusive breastfeeding, which was also supported by other studies.

A systematic review evaluating telehealth interventions specifically looked at educational components as well as text messaging and internet-based interventions to improve EBF (DeNicola et al., 2020). Nineteen articles including 6,827 participants in antenatal and postpartum period were selected. Forty-seven studies met inclusion criteria for this systematic review. Telehealth interventions overall improved outcomes related to breastfeeding, even when controlling for income, education, and delivery type. Compared to the control group, the intervention group had a significantly higher rate of exclusive breastfeeding at 6 months than the control group, with an odds ratio of 2.67 (95% CI 1.45-4.91). This SR did not specifically evaluate EBF at discharge from the hospital. Text messaging was found to be helpful to reinforce certain behaviors, including breastfeeding. Also, motivation was identified as a “critical

prerequisite” (p. 380) for success of telehealth interventions in the perinatal population and should be considered.

Level II Randomized Controlled Trials

Three randomized controlled trials were selected for synthesis. All three studies included a telehealth and educational intervention. Kellams et al. (2016) evaluated the use of an educational video on breastfeeding and evaluated breastfeeding initiation rates and exclusivity during the hospital stay for 522 low-income, at-risk pregnant women during the third trimester of pregnancy who were randomized into groups. Low-income women have been shown to have more barriers to EBF duration (CDC, 2017). This study showed that one breastfeeding educational video is not enough to influence EBF rates in the hospital setting. The authors suggest that “small, frequent bursts of breastfeeding education throughout prenatal care may be more effective than a single intervention” (Kellams et al., 2016, p. 157) and efforts likely required efforts beginning in pregnancy or prior to pregnancy. However, the study is helpful in highlighting the need for prolonged education.

Ahmed et al. (2016) conducted a randomized trial with 141 mother dyads where the intervention groups received access to an online breastfeeding monitoring system and were prompted to record breastfeeding output data after discharge. This group also had access to professional education resources including feeding information, milk management, correct latch techniques and return to work information. Information was monitored by research assistants and an LC. At hospital discharge no difference between intervention and control group were noted; However, the study showed increased duration among intervention members over control group members (84% over 66.7% breastfeeding at 3 months). Mothers in the intervention group breastfed approximately 50% more per day. This highlights that web-based interactive breastfeeding systems may be effective in increasing breastfeeding duration, exclusivity, and intensity, although it did not specifically address initiation.

Finally, Puharic et al. (2020) evaluated proactive telephone support and written material among first time mothers in Croatia. Four hundred women were randomized. Intervention group received a breastfeeding booklet during pregnancy as well as phone support during pregnancy and four telephone outreach calls after delivery, at 2, 6, and 10 weeks Postpartum. Outcome variable was EBF at three months. EBF rates. The intervention led to a significant increase in EBF among first time mothers, as well as improving attitudes toward infant feeding, indicating that prenatal education and proactive outreach may be effective for increasing duration. Initiation rates were not reported.

Level IV – VII Evidence

Finally, four additional studies were analyzed and used for synthesis. They included a cohort study and three descriptive studies. All of these studies evaluated the effects of text messaging and/or social media on breastfeeding rates. Harari et al. (2017) found that text messaging was effective for mothers meeting their breastfeeding goals ($p = .06$) and participants were highly satisfied with the intervention that used texting, peer counselors and patient personalization. It is also important to point out that 80% of participants were millennials, addressed earlier in this paper. Gallegos et al. (2014) found that a text messaging service delivered once per week for eight weeks in postpartum women increased duration of exclusive breastfeeding women over the control group. (Six % decrease vs. 14% decrease in EBF [$p < 0.001$]).

Social media has also been shown to be highly engaging for millennials (Wilson, 2020). Breastfeeding confidence, knowledge and attitude are highly correlated with influencing exclusive breastfeeding. Social support had a direct effect on these aspects for breastfeeding women. Wilson showed that while breastfeeding knowledge is important, it may not directly lead to increased duration. “Instead, increased knowledge leads to increased confidence and more positive attitude, which indirectly influence increased BF duration” (p. 342). Similarly, Brown et al. (2014) found that health promotion text blasts can improve single, low-income adolescent

health behaviors, including breastfeeding, another at-risk group. The text blasts in this study allowed for asynchronous, yet timely delivery of information and encouragement. Mothers felt connected and felt health information was readily available to them when they wanted it. The mothers in this intervention group provided breast milk to their infants for the full six months of the study, better than the national average of 47.2% (CDC, 2021, February 22).

Synthesis/Recommendation

A review of the literature demonstrates that all forms of extra support influence exclusive breastfeeding rates (primarily in duration vs. initiation) and indicated that women breastfeeding prefer technology-associated connections over other forms including face-to-face. Because mobile networks are now estimated to be available to 96% of the world's population, mobile phones, and other technology-based services are attractive modes of delivery for health interventions (Gallegos, et al., 2014), especially for millennials who prefer technology-based support over in-person support for many health issues. Based on the findings, any support given for breastfeeding increases the initiation and longevity of exclusive breastfeeding. In-person, direct support has been traditionally preferred due to direct feedback and observation; however, due to the current climate of social distancing and limited face-to-face interactions, technological and virtual support is preferred at the current time. In addition, text messaging shows to be an effective method for reaching current women of childbearing age (millennial age born between 1980 and 2000) as their preferred method. This group prefers texting and social media use over face-to-face interaction (Hussey et al., 2016).

In conclusion, evidence indicates that any support given for breastfeeding helps increase exclusive breastfeeding rates. Due to the current climate and due to repercussions of COVID-19, nursing support has needed to adjust to allow for innovative interventions, including telehealth and internet-based applications. Additionally, millennials are of child-bearing age and tend to prefer technology-based support over face-to-face support. This evidence-based project

evaluates the effectiveness of an electronic-based education intervention to determine its effectiveness on exclusive breastfeeding outcomes in inpatient mothers.

Chapter 3

Project Plan

The project design plan is essential as it translates the best evidence into clinical practice to improve patient care outcomes and improve healthcare expenditures (Melnyk & Fineout-Overholt, 2019). While evidence supports in-person support with lactation professionals and peer support groups is shown to improve exclusive breastfeeding rates, the pandemic has altered the way we traditionally provide breastfeeding education. Because technology has been shown to improve outcomes in perinatal settings and in-person classes are not occurring at this time, the plan for the implementation of this project based on the available evidence is to use an electronic-based education system to provide patients with knowledge, virtual support, and best available evidence about benefits to mother and baby on exclusive breastfeeding for the early days of life and beyond. In-patient support will remain the same with nurses and lactation specialists providing hands-on support for admitted mothers.

Project Models

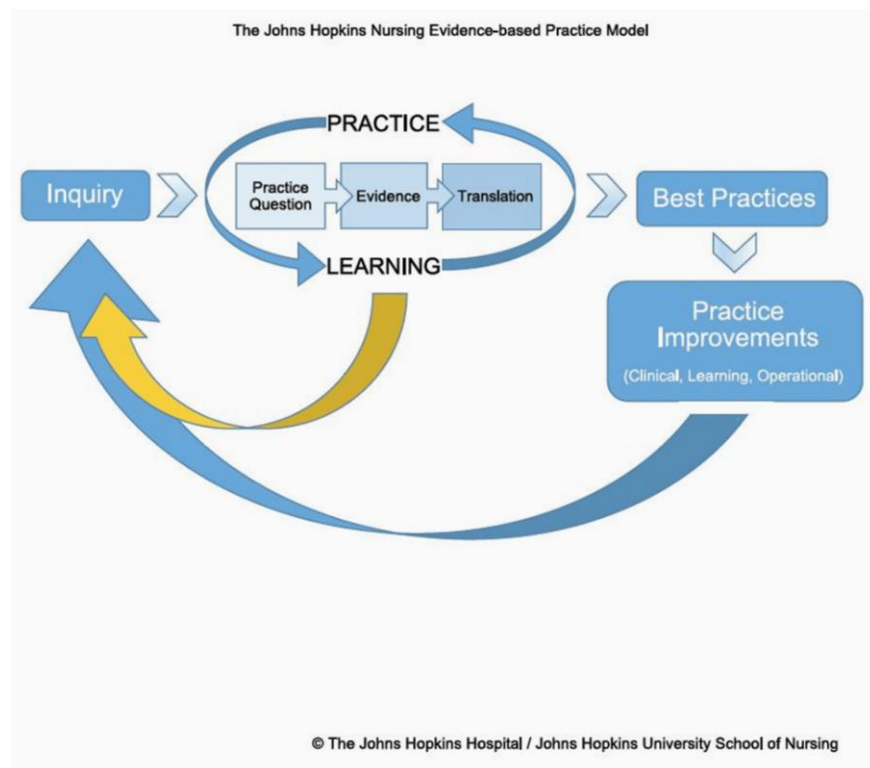
Two models served as the foundation for this project.

Johns Hopkins Evidence-Based Practice for Nurses and Healthcare Professionals Model

The Johns Hopkins evidence-based (JHEBP) practice conceptual model is helpful for all levels of available evidence. The JHEBP Model applies to any setting where nursing is practiced (Melnyk & Fineout-Overholt, 2019) and where the problem occurs. The authors explain the model was developed to fill the gap between nursing practice and implementing research results. The model initiates the PET (Practice, Question, Evidence, and Translation) process which “promotes learning as individuals and teams gain new knowledge and insights that impacts practice” (Melnyk & Fineout-Overholt, 2019, p. 413). Within the PET process, are 19 prescriptive steps that guide implementation. This model intends to include ALL evidence, including non-research, which may still be helpful in answering the clinical question.

Figure 2

The Johns Hopkins Nursing Evidence-based Practice Model



Model for Improvement: PDSA

The Plan-Do-Study-Act [PDSA] has been widely used for Quality Improvement projects to learn about change on a small scale (Melnik & Fineout-Overhold, 2019). By planning and implementing on a small scale, new ideas can be advanced on a larger scale to change system-level practices to improve patient outcomes once demonstrated to be effective in that organization. PDSA helps to break down large tasks into smaller ones in order to change and adjust throughout the project as the need arises. PDSA helps generate internal evidence which is important for demonstrating best practice at the smaller level prior to larger levels, where convincing others becomes essential. This project incorporated PDSA as part of the initiative.

For this project, I used PDSA in the following manner (AHRQ, 2020).

Plan: establish focused education for my problem that will engage users and encourage them that exclusive breastfeeding is the best way to feed their infant. I hope this results in more mothers who understand the benefits and breastfeed exclusively while in the hospital setting. This will be done by specified patients engaging with a technology-based education program that will send messages to them weekly focused on breastfeeding. This extra reinforcement and encouragement should help increase EBF numbers in the hospital.

Do: Patients entering prenatal care will be automatically enrolled in the “Healthy Pregnancy” education application. I will monitor user interaction and see how many people are opting out of regularly sent messages. I will also begin monitoring clinic interactions to ensure information is being given to patients during their prenatal visits.

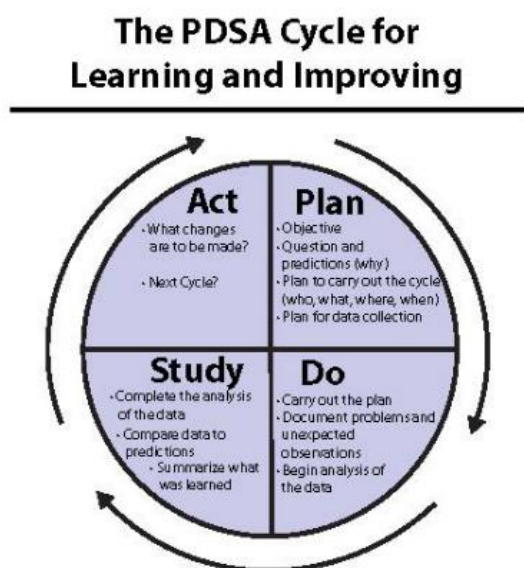
S: I will analyze data in Epic prior to and after three months to compare previous EBF rates to current EBF rates for three months since the implementation of the program. I hope to see an increase in this number. If this number is not improved, I will need to determine if users have access (auto enrolling is working successfully), if they are using it, and how effective it is in providing support for EBF while in the hospital and prior to admission.

A: Depending on the outcome, we may need to further customize the application for EBF information to provide benefits of enrolling in the e-technology educational program

(Institute for Healthcare Improvement, 2021)

Figure 3

The PDSA Cycle for Learning and Improving



Expected Outcomes

Based on current evidence, improving education, resources about the benefits of breastfeeding, and with peer support enhance breast feeding practices. Because the pandemic changed how we normally conduct business, many facilities that support new mothers were forced to use innovative methods to reach patients. As a result, many technological practices evolved that demonstrated that technology could be used in place of in-person interactions if necessary, and as a result, could also improve patient outcomes (Skouteris et al., 2017; Patnode et al., 2016; DeNicola et al., 2020). After implementing the electronic-based education program, I expected to see an increase in exclusive breastfeeding rates in the inpatient perinatal setting. The Joint Commission does not specific a specific number. Only an “improvement” (The Joint Commission, 2015). The average EBF numbers for this facility averaged about 40% each month, with some months post-COVID, dropping to as low as 30%. Information was collected in the Electronic Health Record via Epic through de-identified information.

Because in-hospital exclusive breastfeeding is a perinatal core measure (The Joint Commission, 2015), these data are collected through EMR reporting in order to be compliant with Center for Medicare and Medicaid Services and affects financial reimbursement. The intervention is effective if we see an improvement in exclusive breastfeeding numbers from the time prior to implementation to after. This information is collected in a report and can further be stratified by geographical location and other demographics. I specifically looked at the health plan patients because they had access to the educational program through contractual agreements and I planned to analyze data based upon user interaction. Other patients were excluded since they did not have access. In the future, a grant proposal will be submitted to cover costs associated with the application for non-health plan members and evaluated for effectiveness.

Ethical Review

The project was presented to the EBP Council and due to the nature of a quality project vs. research, and Institutional Review was not required by the Council.

In addition to the institutional EBP Council mentioned above, an ethical review was completed by the faculty mentor and student when deciding on the project plan and possible associated risks and benefits to patient prior to planning and implementing project. Risk to patients were none to minimal and any information was de-identified for patient protection and kept in password kept computers requiring virtual private network (vpn) from offsite locations.

Plan for Communicating Changes

Changes were reported as soon as possible after the identification of problems or obstacles hindering plan to the unit director, the associated Nurse Informaticist as well as the EBP director to determine the best course of action and change plan.

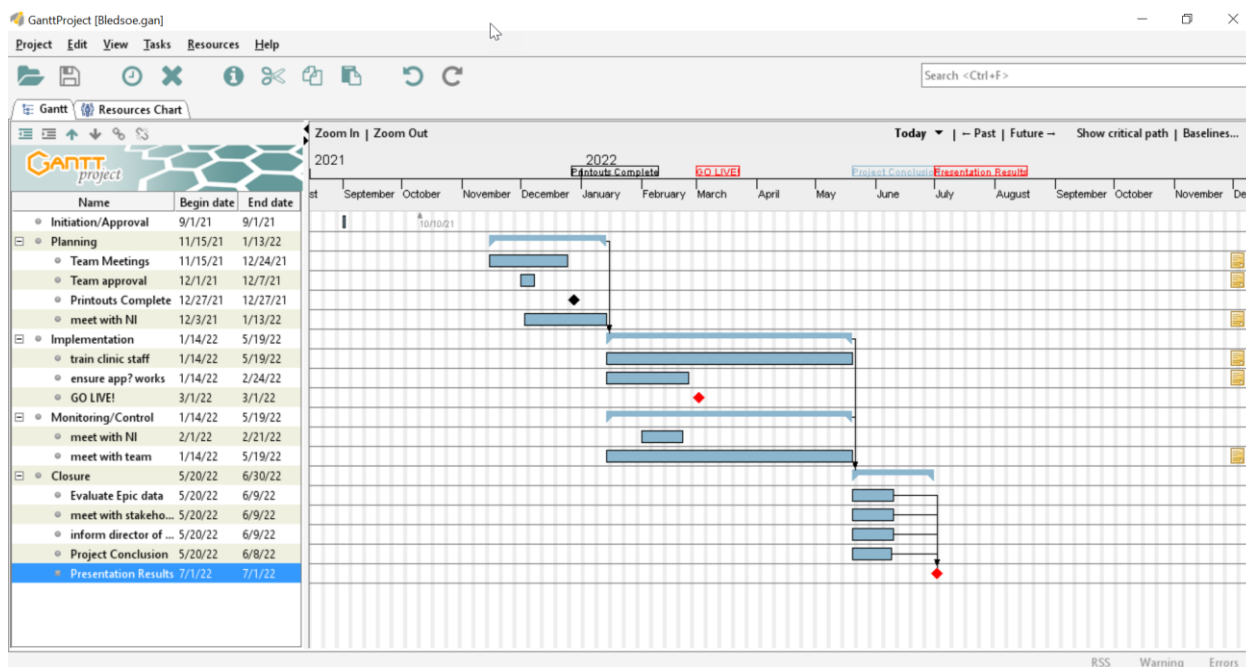
Implementation of Interventions

The intervention plan was approved on September 1, 2021, through the Baylor Scott and White Evidence-based Practice Council. Regular meetings were held with internal stakeholders

to update on the status of project. The Go-Live date for implementation of the electronic education system was March 1, 2021. Key team members met bi-monthly to review and adjust as needed. The intervention continued for three months. At the conclusion of three months, analytic data was collected to determine the outcome of the intervention.

Figure 3

Timeline of Project [Gantt Chart]



Data Collection Plan

Data was collected through Epic analysis reports and analyzed for improvements (increases in exclusive breastfeeding rates). If the percentage increased, we could presume the intervention was effective. Data is owned by the facility and permissions were granted through unit directors with the assistance of nurse informaticists. As an employee, I had access to these reports and have been approved by the unit director, and also, the nursing leadership through the Evidence-based Council. Additional data collected was to include interactions, including those who opted out and who, therefore, did not have access to the intervention. Data sets were delimited to include only medical record number based upon health insurance plan. The data

was kept confidential as nothing will be printed from the reports, which could include protected health information. Only exclusive breastfeeding rate numbers for the facility during the designated time periods was reported.

Data Analysis Plan

Data was collected from the electronic medical record, where exclusive breastfeeding data is collected and reportable by month. Percentages of exclusive breastfeeding rates from previous time periods will be compared to similar time periods after the intervention is implemented. Considerations of time are pre-COVID-19, during COVID-19 and current year. Any improvements in exclusive breastfeeding rates at time of discharge will indicate a successful intervention.

Final Budget

The budget consisted of in-kind donations of key members' time and expertise. The cost of the Healthy Pregnancy Application was purchased by the institution and already planned to use for general prenatal education. The cost of the application was \$25,000. The original budget consisted of having a backup plan of printouts for clinic nurses to give patients in case the digital application did not work.

Unfortunately, the digital application did not work as anticipated; however, when this problem was discovered and reported, key members of the project did not feel that paper education would be a good substitute for electronic education due to the factors mentioned already including time to educate the patient (even with printouts) and the fact that this population prefers electronic education over face-to-face interactions. Also, it would have been nearly impossible to determine who received and read the information and accurately report data from this method compared to an electronic method. Therefore, the original part of the budget plan was rejected after project implementation and discussions. The costs were all related to time and troubleshooting application problems, which were already part of many of the team members' regular jobs and workflow.

Figure 4

Budget

	B	C	D	E	F	G	H	I
1	Implementation of an electronic-based patient education system to improve exclusive breastfeeding							
2	Proposed Project Budget							updated 8/15/2021
3	Project Lead: Christy Bledsoe							
4	Start Date: 9/1/2021							
5	Tasks	Description	Hrs/Units	Rate/Cost	Subtotal	In-Kind Donation	Budget	Comments
6	Initiation							\$0.00
7	Meet with key members	discuss plan and options	2.00	\$40.00	\$80.00	\$100.00	\$0.00	2 - 1 hr meetings
8	Planning							
9	Team Meetings	discuss training and rollout	3.00	\$40.00	\$120.00	\$120.00	\$0.00	3 - 1 hr meetings
10	Printouts	instructions for staff/pt handout	150.00	\$0.10	\$15.00	\$0.00	\$15.00	printouts
11	Digital Care	Using Digital Care Journey		\$1,000.00	\$1,000.00	\$1,000.00		included already through contract?
12	(Alt) Text Blast messaging or fb page	education platform			\$0.00			no cost, just my time
13	meet with NI	help with report setup	1.00	\$50.00	\$50.00	\$50.00	\$0.00	NI time to help with reports
14	Execution							
15	Training of staff	30 minute huddles x 3	3.00	\$12.50	\$37.50	\$37.50	\$0.00	attend morning huddles to explain x 3; estimated staff cost for 1/2 hour each
16	Monitoring & Controlling							
17	meet with team	1 hour meeting	3.00	\$40.00	\$120.00	\$120.00	\$0.00	discuss results so far
18	Closing							
19	evaluation of data	presentation	3.00	\$40.00	\$120.00	\$120.00	\$0.00	
20								

Sustainability Plan

The sustainability plan included to continue using the electronic education system for qualifying patients with adjustments and customizations completed to improve user function. However, because the project was unsuccessful due to the app not working as anticipated, the plan would be considered after successful implementation. If successful, the idea will be presented to include all patients, not just insured health plan participants. Because minority mothers have greater challenges to maintaining exclusive breastfeeding (Centers for Disease Control 2017, July 12) due to a myriad of reasons, plans to enhance education and support for these mothers would be beneficial in sustaining improved exclusive breastfeeding rates moving forward. I envision having a free or low-cost program that patients are automatically enrolled in during their first prenatal visit and opting-out is the exception rather than the rule. Electronic lactation support could be offered with a digital care coach escalation in place for those mothers needing additional support to maintain exclusive breastfeeding after discharged from the inpatient setting.

Dissemination Plan

If successful in the future, findings will be presented to internal stakeholders (obstetric management and vice-president of patient services of the unit) in a PowerPoint which can then be presented to nurses of the unit. Additionally, findings will be reported at the monthly EBP Nursing Council meeting through a virtual presentation. Attendees include executive nurse leadership, nursing research leadership as well as council members. Findings can be disseminated to external stakeholders through professional organization conferences through poster presentations or through the health-care organization when they hold EBP project days where presentations are presented for the organization. Additionally, my local Association of Women's Health Obstetrics and Neonatal Nurses (AWHONN) will be interested in this outcome since this core measure is evaluated at every hospital accredited by the Joint Commission. Nationally, it affects outcomes for all mothers and babies and therefore, can be disseminated at national and international conferences such as Sigma. I plan to submit results to the national conference for AWHONN and also to their journals, as they publish nursing research and works. The two journals that I would likely submit to would be *Nursing for Women's Health* and *Journal of Obstetrics, Gynecologic and Neonatal Nursing*. Many of the articles they publish are related to my project.

In conclusion, it is evident in the literature that new innovative, evidence-based approaches should be considered and implemented to increase user satisfaction and preferences in the perinatal setting. Because millennials are comfortable with technology and may prefer it over traditional face-to-face interactions, technology should be considered as a useful tool in improving perinatal outcomes. Exclusive breastfeeding is identified as Perinatal Core Measure Number 5 by the Joint Commission and increasing EBF rates at admission not only has financial implications for accredited facilities through reimbursement allowances, but also is the best and recommended feeding for infants through six months of age by health organizations world-wide and has been shown over and over to improve the health of both

mothers and babies. It is essential that we improve breastfeeding rates in the United States if we hope to improve the overall health of our citizens, now and for the future.

Chapter 4

Project Results

The following information will discuss the results, the meaning of results, and limitations. While I had hoped that the digital education application would be implemented without any problems, as with much Information Technology, there were some obstacles encountered due to multiple projects occurring simultaneously that could not be addressed in time to affect this project implementation.

Results

The intended application of “Healthy Pregnancy” was implemented in March of 2022 for health plan insurance commercially covered pregnant clients. During this time, there were many other data collection and IT projects going on in the institution. After some time, it was noticed that the education was not going out as intended and it was unclear if patients were receiving the educational breastfeeding content as planned. It seemed to be working at first; however, patients began reporting to nurses working with them that the education was giving errors when trying to open up education videos and information. This was an unanticipated problem and resulted in an inconsistency with the planned intervention. In addition, it was discovered that the initial testing environment had been conducted in the desktop application versus the mobile application, where the majority of patients would access the information.

Data Analysis Results

It is not clear if the education helped or not as the Healthy Pregnancy application did not work as expected, and often patients were unable to be reached and information could not be verified through manual measures via direct phone call.

It was also discovered that the application had been tested in a desktop environment versus a mobile environment, so information and education appeared to be working from an IT perspective. However, after further discussion and evaluation, the team realized this was an obstacle not anticipated from the planning state. Since the application is designed to be in a

mobile environment, I assumed it be tested in the same environment. This was not the case and resulted in problems with the planned outcomes and only discovered well into our timeframe.

It would be worthwhile to re-conduct this project after adequate time is dedicated to work through any application kinks identified in the program and to ensure that appropriate members are receiving all the intended educational information to determine if education indeed had an impact on exclusive breastfeeding rate patterns.

Because the application did not work as anticipated, it is unclear if prenatal education about exclusive breastfeeding sent through the mobile application and/or text promotes exclusive breastfeeding prior to discharge.

Limitations

Limitations are that the technology did not work as anticipated and due to this, some patients were manually sent information which resulted in inconsistencies such as forgetting to send information or sending it at incorrect times, whereas the app is electronic and sends at automatically designated time periods based upon gestational age. Also, the fact that only those with specified insurance plans could participate was a limitation. Evidence shows that those with insurance are more likely to utilize healthcare services and have better outcomes than those with no insurance (Institute of Medicine, 2022). To improve perinatal outcomes, health interventions should be directed at those who are not insured or underinsured, which was not included in this project.

Finally, pregnancy is a 40-week (or 10-month) process. Ideally, breastfeeding education would start at the first prenatal visit (around 8-12 weeks) and continue through the Postpartum time period. Due to the nature of the project timeline, a limited time was allotted to implement and capture information. A longer timeframe might provide more insight in the future. Anticipation of problems with technology and more IT personnel support should also be a greater consideration when for the next implementation.

Conclusion

In summary, while the literature suggests an electronic perinatal education program could improve breastfeeding rates, that could not be determined during this project due to a myriad of unforeseeable factors. COVID-19 highlighted the need for increased telehealth programs, including education, to support patients and the literature promotes electronic communications for millennials due to preferences. This electronic education application has much potential to enhance education and shows promise for future development in the current context of health care and global health concerns.

Chapter 5

Project Discussion

This chapter will include internal and external implications for the maternity population, the organization and related health policy aspects. Sustainability will also be discussed and what measures may be considered to ensure that the project can be successful in the future and ways to evaluate effectiveness and usability.

Internal Implications

Discuss implications for target population, organization, and/or patients The implications for the maternity population are significant because measures to enhance patient health are significant when used appropriately and supported technologically. As mentioned in background, measures to support care between visits can be improved and/or enhanced through telehealth, including education applications such as the “Healthy Pregnancy” app. Studies have indicated improved breastfeeding rates as well as improved satisfaction among patients participating in telehealth measures (Cantor et al., 2022).

Implications for the organization are significant both economically and through improved outcomes. Improved breastfeeding rates within a CMS participating hospital can result in improved reimbursement rates by meeting related Core Measures, or at minimum, not being fined for not meeting the measure. As discussed, improved breastfeeding rates save thousands of dollars through the decreased need for healthcare for both mothers and babies due to improved mortality and morbidity rates due to successful and sustainable breastfeeding.

External Implications

Implications for nursing practice and health care related to improved breastfeeding rates are good for the entire population and not just limited to the mother-baby population group. Breastfeeding can save the United States billions of dollars in health-care related expenditures due to the preventative nature of exclusive breastfeeding. Decreased rates of infections, GI illness and SIDs are all decreased in infant population through breastfeeding. Maternal

populations experience decreased risk of cancers and chronic diseases including hypertension and diabetes. As more attention is brought to the dire rates of maternal mortality rates in this country, this is one way to improve the health of the population now, without a huge cost or risk to patient.

In order to improve breastfeeding rates in the United States, healthcare policies must be implemented to support parental leave time to allow for bonding and the establishment of effective breastfeeding patterns. While many strides have been made related to maternal-health legislation, we still have a long way to go in order to support families through enhanced leave time and supportive postpartum care that extend beyond the typical 12-week time period. Human resource policies will need to be revised and adjusted to allow for these changes so women can feel confident about retention of their careers when leaving to care for their families. While many changes have been made in recent years to support breastfeeding at work, in public and in policy, there is still much work to be done.

Sustainability

The sustainability plan is focused on using the electronic education system for qualifying patients with adjustments and customizations completed to improve user function. If successful in the future, the idea will be presented to include all patients, not just insured health plan participants. Because minority mothers have greater challenges to maintaining exclusive breastfeeding (Centers for Disease Control, 2017, July 12) due to a myriad of reasons, plans to enhance education and support for these mothers would be beneficial in sustaining improved exclusive breastfeeding rates moving forward. I envision having a free or low-cost program that patients are automatically enrolled in during their first prenatal visit, and opting out is the exception rather than the rule. Electronic lactation support could be offered with a digital care coach escalation in place for those mothers needing additional support to maintain exclusive breastfeeding after discharged from the inpatient setting.

Dissemination Methods

In the future, when further iterations of this project are carried out and data is obtained, findings will be presented to internal stakeholders (obstetric management and vice-president of patient services of the unit) in a PowerPoint which can then be presented to nurses of the unit. Additionally, findings will be reported at the monthly EBP Nursing Council meeting through a virtual presentation. Attendees include executive nurse leadership, nursing research leadership as well as council members. Findings can be disseminated to external stakeholders through professional organization conferences through poster presentations or through the healthcare organization when they hold EBP project days where presentations are presented for the organization.

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In conclusion, it is evident in the literature that new innovative, evidence-based approaches should be considered and implemented to increase user satisfaction and preferences in the perinatal setting. Because millennials are comfortable with technology and may prefer it over traditional face-to-face interactions, technology, and telehealth measures should be considered as a useful tool in improving perinatal outcomes. Exclusive breastfeeding is identified as Perinatal Core Measure Number 5 by the Joint Commission and increasing EBF rates at admission not only has financial implications for accredited facilities through

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